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CONTENTS

	PAGE
Editorial Notes	525
European Conference of Ministers of Transport	527
An Informative Transport Congress	528
Buildings on Moving Ground	529
A.R.E.A. 1960 Convention	529
Letters to the Editor	530
The Scrap Heap	531
Overseas Railway Affairs	532
Automatic Train Control in Western Germany	534
British Transport Hotels	535
Numerical and Letter Codes on Railways	537
Electric Traction Section	539
Personal	545
New Equipment and Processes	548
News Articles	550
Contracts and Tenders	553
Notes and News	554
Railway Stock Market and Official Notices	556

Road Vehicles on Rail

GROWING congestion on the roads, to which the Minister of Transport, Mr. Ernest Marples, has drawn attention on several occasions recently, should result in further consideration of the possibilities of combining the best of road and rail transport. In the movement of goods the container goes far to afford door-to-door transport combined with speed. The wages costs of a train of wagons loaded with containers, such as the "Condor" between London and Glasgow, which requires a crew of three (two enginemen and a guard), changed at Carlisle, are low compared with those for the road vehicles needed to carry the same load. This economy, which becomes relatively larger in relation to terminal costs as the distance increases, has been an important factor in the development of the conveyance of loaded lorries on railway flat wagons ("piggy-back" traffic) in the U.S.A. and Canada. The restricted loading gauge in Great Britain is an insuperable obstacle to this, but the potentialities of the combined road-and-rail vehicle in this country have yet to be realised. Tests are being conducted by the British Transport Commission with such a vehicle,

an adaptation of an American design. It has all the advantages of a container, with the additional one of being low-hung, so that the height of the load can be greater than that of many road vehicles. In expressing his great concern at the number of road accidents and street congestion in the cities, Mr. Marples has in mind the growing number of private motorcars. The growth of industry and trade may be deemed to necessitate motorways between large centres, but road building to serve a large amount of seasonal motorcar traffic, as for instance on holiday, to and from seaside resorts, takes second place as a matter of national welfare. Nor are there fewer accidents on many roads so built. One solution is to increase the amount of trains conveying motorcars accompanied by drivers and passengers. The car/sleeper and car/tourist day trains of British Railways can convey up to 28 cars. The advantages from the aspect of road traffic congestion are obvious. Nor need the provision of special wagons for motorcars be a harder problem than that of ordinary passenger vehicles used in the peak season. In the meantime the most likely scheme for a railway tunnel under the Channel is based on conveyance of passenger and goods road vehicles on railway wagons, though traffic on combined road-rail vehicles does not seem to be envisaged.

New Fares in Perspective

PROMPTLY on the recent announcement of fares increases on British Railways, the Eastern Region issued a forthright statement. So far as that Region was concerned, it was pointed out, season ticket travel was the cheapest form of travel practically anywhere in the world. Even when the cost was spread only over a five-day week, with two journeys each day, 300 miles of railway travel could be purchased at the new rates for less than 30s. The three-monthly season ticket worked out on average, on the five-day week basis, at about 1½d. a mile; when other journeys were added, the cost was considerably less. The ordinary fare, even at 2½d. a mile, it was explained, would be only 1d. a mile more than the standard third (now second) class fare 50 years ago; even taking the comparison least favourable to railways, the 2½d. fare would be only one-and-a-half times greater than the 1d. a mile monthly return fare of the 1930's. The Eastern Region is to continue to offer many travel facilities at less than the standard rate, including mid-week tickets and off-peak travel in the London area. By comparison with the increase in price levels of virtually all other commodities, railway travel in Great Britain today is cheap.

Indian Railways in 1958-59

FROM preliminary information it seems that the financial year ended March 31, 1959, marked a decided slowing down in the previous rapid rise in Indian railway traffics and revenues. In that year tonnage carried rose by only 1.8 per cent and ton-mileage by 2.4 per cent, whilst passenger-mileage actually fell slightly. Consequently goods earnings increased by £8,350,000 and passenger receipts were £1,770,000 lower than in the previous year. Working expenses rose by £9,110,000 and the net result of operation after meeting all charges was a surplus of £4,450,000. As the expected volume of traffic for which assets had been built up failed to materialise there was a slight fall in operating efficiency. Nearly 200 miles of line were opened for traffic. Altogether 544 miles were either under construction or sanctioned by March, 1959; the doubling of 299 miles of existing line was sanctioned. New rolling stock placed in service included 268 locomotives, 1,740 coaches and 16,700 wagons in terms of four-wheelers.

Inquiry into Nigerian Railway Corporation

BECAUSE of an expected deficit of some £1,000,000 in the working of the Nigerian Railway Corporation in the current financial year, due mainly to the intensification of road transport competition, the Federal Government decided earlier this year to appoint a Commission, under the Commissions of Inquiry Ordinance, to inquire into the economics, administration, and industrial relations of the Corporation. The names of the Commissioners have now been announced. Dr. T. O. Elias, Nigerian Research Fellow and Lecturer at the Commonwealth Studies Institute at Oxford, has been appointed Chairman; other members are Sir Arthur Kirby, London

Commissioner for East Africa, and Dr. Pius Okigbo, Economic Adviser to the Eastern Nigerian Government. It is difficult to see the reason for the Commission in view of the high standards of efficiency usually associated with the Nigerian Railway Corporation. Of the three Commissioners only Sir Arthur Kirby, who had a long and distinguished railway career including the General Managership of the East African Railways & Harbours, has had any experience of railway administration.

Overseas Railway Traffics

NET operating receipts of the Benguela Railway for the first three months of 1960 amounted to 65,984,000 escudos after allowing for African working expenses of 67,552,000 escudos. These figures demonstrate the remarkable recovery in traffic from the same time last year. Net operating receipts for the first quarter of 1959 were only 39,015,000 escudos. The recovery, which started in the second half of last year, has come from a revival in mineral traffics. These freights are largely in the form of manganese ore which is destined for the United States steel industry. The total tonnage carried by the railway last quarter amounted to 400,512 compared with 288,294 in the same period of last year. Paraguay Central Railway receipts continue to fluctuate from week to week, but generally returns are below those of the previous financial year. At April 15, aggregate receipts amounted to G72,789,395, a decrease of G2,381,856 compared with the corresponding period of 1958-59. Salvador Railway Company receipts for February, 1960, amounted to colones 333,000 compared with colones 230,000 in February, 1959, an increase of colones 103,000.

Linking India and Pakistan

DISRUPTION of the railway system of the Indian sub-continent caused by Partition in 1947 is being healed. Discussions were held recently in New Delhi between delegations of the Governments of India and Pakistan, headed by the Chairmen of their respective Railway Boards, Mr. K. B. Mathur and Mr. S. A. Suhrawardy, on ways of improving railway communications between East and West Pakistan, across the Republic of India; and between West Bengal and Assam across East Pakistan. After preliminary discussions the meeting divided into committees to consider the several aspects of the question. Some details are given in our Overseas pages. The problems are largely those of rates for transit traffic and of Customs and other controls at the border stations. Some time elapsed after Partition before regular train services could be resumed across the borders, and in the meantime the Government of India went to great expense in building the Assam Link line, which avoids East Pakistan territory.

Formation of Jamaica Railway Corporation

WITH the object of promoting efficiency and economy by freeing the Railway of political interference other than on matters of real public importance, and to provide flexibility and speed of decision, the Jamaica Government Railway has changed its name and organisation. The Jamaica Railway Corporation has been set up with effect from April 1, 1960, in accordance with Law 1 of 1960. It is an independent Statutory Corporation, all of whose shares are owned by the Government. The railway had its origin in a 14-mile line built by the Jamaica Railway Company from Kingston to Angels. This was opened on November 21, 1845, and was the earliest colonial railway of the British Empire. The undertaking was bought by the Government of Jamaica in 1879, but in 1890 the railway was sold to an American syndicate, the West India Improvement Company. In 1900 the Government of Jamaica again took over the railway after default by the American syndicate. New lines were built under each successive ownership, and today there are 208 miles open to traffic.

Scottish Region Traffic Organisation

THE three Divisional Traffic Managements in the Scottish Region, British Railways, at Glasgow, Edinburgh, and Inverness, were brought into operation last Monday, 15 months after announcement of the broad principles of the

reorganisation. We commented in our issue of January 23, 1959, on the difficulty of dividing the railways of Scotland in accordance with either railway or general economic geographical considerations. The Glasgow & South Western Division, with headquarters in Glasgow, comprises the Ayr and Glasgow Districts; the East Coast Division (Edinburgh), the Aberdeen, Dundee, and Edinburgh Districts; and the Northern Division (Inverness), the Inverness and Perth Districts. The Traffic Managers co-ordinate all commercial, operating, and motive power activities. The District officers concerned are responsible in these matters to their Traffic Managers. The former Regional headquarters offices of the Chief Commercial Manager, Chief Operating Superintendent, and Motive Power Superintendent have been closed. Reference already has been made in our personal columns to the appointments of Mr. G. L. Nicholson, Mr. J. M. Fleming, and Mr. H. M. Herbert as Divisional Traffic Managers respectively at Glasgow, Edinburgh, and Inverness. They are responsible to the General Manager, Mr. James Ness, on whose behalf the Assistant General Manager (Traffic), Mr. S. E. Raymond, functions, assisted by a small group of specialist officers.

U.K.R.A.S. in Operation

THE visit to Britain last week of Señor Angel Ignacio Ortiz, General Manager, National Railways of Colombia, was further evidence of the way in which the United Kingdom Railway Advisory Service is helping railways overseas. His inspection of some of British Railways installations and equipment, and of the plants of British manufacturers of rolling stock and signalling equipment is recorded elsewhere in this issue. The extremely comprehensive programme arranged by U.K.R.A.S. will undoubtedly have been of great value to Señor Ortiz and his administration in considering motive power and signalling equipment for the National Railways. His principal concern was in diesel-electric locomotives although he showed keen interest in British Railways electrification programme. There is a possibility that electrification may be adopted for some heavily trafficked lines in Colombia although no decision has yet been made as to the system of operation to be used. Speaking at the dinner given in his honour last week, Señor Ortiz expressed his gratitude to U.K.R.A.S. for enabling him to see the progress being made by British Railways with its modernisation programme.

Past and Present Crewe Men

THE annual dinner of the Crewe Pupils' & Apprentices' Association has had its glories and vicissitudes. Between the wars the Association was flourishing and the dinner was extremely well supported. The break between 1940 and 1952 was a sufficient gap in continuity to have its effect on attendances and some difficulty was experienced in reviving the function. In 1953 Mr. R. A. Riddles presided at a dinner held at Crewe, but then there was again a lapse until 1957. Since then Mr. F. B. Roberts has been the Honorary Secretary and he has worked assiduously and successfully to restore much of the former popularity of the event. From relatively small beginnings in 1958, he has succeeded in building it up until this year 61 persons were scheduled to attend the fifty-third dinner, which was held last Friday. Sir Reginald Terrell presided and the speakers were Mr. Gerald Collingwood, Chairman of the Locomotive & Allied Manufacturers' Association, who proposed the toast, "Past and Present Crewe Men," to which Mr. F. J. Hookham replied on behalf of past Crewe men, and Mr. A. J. Marsden on behalf of present Crewe men. The response to the toast of the guests, proposed by the Chairman, was made by Mr. R. A. Smeddle, President of the Institution of Locomotive Engineers.

Chemical Weed Control

THE control of weeds on railway track is the constant endeavour of civil engineers not only on British Railways but on railway systems throughout the world. In recent years considerable advances have been made in the control of weeds by chemical treatment, and on British Railways several systems have been subjected to exhaustive tests over a number of years. In recent issues details have been given of the methods employed, with some descriptions of the chemicals used and the

means by which these have been distributed over the permanent way. The cost to railways, both in this country and abroad, is considerable, and a good deal of interest must centre on the methods and chemicals available. Among the letters to the Editor this week is published a contribution by Mr. R. C. Jennings, of the Chipman Chemical Co. Ltd., which is a service organisation, the products of which are not confined to any single chemical. This letter has several useful contributions to make to the present study of weed control, and it makes a number of pertinent observations based on its own experience, as well as those of other organisations both in this country and abroad.

British Transport Hotels

IN our April 1 issue we published an article on the background and basis of railway catering in Britain. This week, Mr. E. J. Vacher, Chief Hotels Manager, British Transport Hotels & Catering Services, outlines the efforts which are being made to continue and improve on past service. He refers to difficulties shared with Continental counterparts, not least among which are the financial problems involved in the continual modernisation which must be made to keep pace with constantly-changing public demands. Developments are carried out with a strict eye to the type of catering required in each district: profitability and necessity are carefully balanced. As Mr. Vacher rightly points out: "It is always easy to find critics who consider all activities in the transport world in a superficial and uninformed manner, but the facts speak for themselves." Listing these facts, he deduces that British railway hotels form the spearhead of the hotel industry in this country as well as in Europe. He may well be right. It would be a pity to blunt this spearhead by entrusting it to hands unaccustomed to its specialised use.

Management—Staff Communications

CONTINUING its tradition of good staff relations, the Western Region of British Railways has found its own way of following the current business trend of keeping all levels of employees informed of management's aims. A series of five quarterly publications has been produced to cover all staff in each of the four new Traffic Divisions—London, Western, Midlands, and Welsh—and Swindon. Hitherto, the Regional staff magazine has dealt broadly with modernisation schemes and other important policy projects, but limitations of space have prevented the matters being dealt with in any great detail. In the new publications, the wider subjects are given divisional treatment and local activities, edited locally, will strike a personal note. Distribution is also personal—each employee will receive his own free copy of his magazine. This development should not only improve internal relations, but should also assist in furthering local loyalties, a valuable asset during the current decentralisation of railway management. The regional magazine will continue to be issued each month and will be able to devote more space to informative articles and matters of wide interest.

Southern Region Alternative Electrified Routes

SCHEMES to relieve the London-Brighton electrified main line of British Railways, Southern Region, have been the subject of correspondence in *The Daily Telegraph*. In reply to a suggestion for conversion of the Sanderstead—Oxted—East Grinstead—Horsted Keynes—Haywards Heath section, Mr. F. D. Y. Faulkner, Public Relations Officer of the Region, has pointed out that the service as far south as East Grinstead is to be worked by diesel-electric trains. Whether these will be replaced eventually by electrification will depend on circumstances. The Horsted Keynes to Haywards Heath section offers hardly any potential traffic, he states, and as an emergency route it does not provide an alternative to the very vulnerable bottlenecks south of Haywards Heath. If the Oxted line is converted, electrification will probably be continued from Hurst Green via Eridge and Uckfield to link up with the electrified lines at Lewes—a route with strong development potentialities which parallels the main line to Brighton. Linked with this is the proposal to complete an alternative electrified route to Worthing and Brighton by conversion from Christ's Hospital to Shoreham.

European Conference of Ministers of Transport

THE sixth annual report of the European Conference of Ministers of Transport (E.C.M.T.) covers the year 1959. The conference, of which the headquarters is at the Château de la Muette, Paris, met in plenary session on one occasion. The United Kingdom was the country whose Minister was Chairman for 1958-59. Mr. Harold Watkinson, who assumed office in October, 1958, was succeeded in October last by Mr. Ernest Marples, and the chairmanship shortly afterwards was assumed, for the following year, by the Netherlands Minister of Transport. The year was marked by a recovery in European economic expansion which showed itself in increases of 4 per cent in the gross product and of 5-6 per cent in the industrial production of the countries embraced by the United Nations Economic Commission for Europe (O.E.E.C.). The report finds that this improvement was not reflected in the volume of goods carried.

In most of the E.C.M.T. countries the decline in railway traffic visible in 1958 continued during the first half of last year, though a reversal of this tendency was noticeable in the later months. The total of goods traffic was comparable with that of the previous year, though it was below those for 1956 and 1957. In Germany, railway traffic suffered from the drop in coal consumption, which was offset by the recovery in steel production and by activity in the building industry.

In railway passenger traffic the slow decline of 1958 continued into the following year. In France, there was an increase of 4 per cent in suburban passenger traffic because of the rapid increase in the population of the Paris area. Yugoslavia, Portugal and Spain had traffic increases ranging from 2 to 6 per cent.

The report points out that coal, which had been severely affected by the 1958 recession, did not share in the general improvement in 1959 as its competitive position in regard to other sources of energy continued to deteriorate. The effects of bringing the first European pipelines into service, a question studied by the E.C.M.T. in a special report, are stated to be perceptible. In 1959 a reduction in the transport of mineral oil on the Rhine amounting to about 2,000,000 tons attributed to the operation of the Wilhelmshaven-Cologne pipeline. Road transport benefited from the record expansion of the iron and steel industry and from the prosperity of the building industry. On the whole, prospects for 1960 are considered rather favourable for goods transport, which should reflect an increase in economic activity. The volume of transport is expected to be affected by the radical changes which are taking place in the policy pursued by Governments as regards sources of power. At the request of the Ministers of Transport, this problem is to be the subject of a study on transport requirements up to 1970.

Electrification of railways made good progress. Some 750 route-miles are stated to have been converted on the four systems used on the Continent (1,500 V. and 3,000 V. d.c.; and 15,000 V., 16½ cycles, and 25,000 V., 50 cycles, a.c.), apart from electrification on British Railways. E.C.M.T. countries in which conversion was carried out are stated to include Austria, Belgium, France, and Italy. No reference is made to electrification in Portugal or Spain. The attention of the Governments concerned was drawn to the fact that there was still no electrification project for the Namur-Liège-Aachen-Cologne line. By the end of 1963, 73 per cent of the international main-line network of Europe (excluding U.S.S.R.) will be electrified. The rate of electrification is, in any case, likely to slacken in the coming years, as it is limited to lines where traffic is fairly heavy.

The progress of diesel traction is more rapid: the number of locomotives of over 350 h.p. rose from 166 at the end of 1950 to 2,614 at the end of 1958 and should reach approximately 3,500 at the end of 1959. This progress shows the importance of standardisation, which is reported to be encountering certain difficulties. In 1958, 43 per cent of the train-miles run were accounted for by steam, 36 per cent by electric and 21 per cent by diesel traction. The corresponding figures in gross ton-miles were: 51, 42, and 7 per cent.

At the end of 1958, 25 per cent of all goods wagons were of the "standard" or "unified" types. There were outstanding orders for 29,114 wagons, 25 per cent less than the previous year; the greatest reduction was for open wagons because of a reduction in bulk traffic.

The report gives the action taken by the various countries in

1959 to improve the financial situation of the railways. They include "normalisation" of railway accounts, *i.e.*, a separate assessment of abnormal liabilities with a view to their abolition or assumption by the State. Several Governments have now admitted their railways' claims for normalisation, and have put them into effect. Other measures relate to technical modernisation of the railways, progress towards management on a more commercial basis and co-ordination with other means of transport. The conclusion is that, although commendable results have been obtained, there is still much to be done.

The results are given of the activities of the Eurofima Company in 1959, which made available to its members Swiss fr. 93,000,000 and D.M. 5,000,000. In the three years since its foundation, the Eurofima Company has been able to borrow Swiss fr. 186,000,000 and D.M. 5,000,000, mainly devoted to financing the purchase of about 3,500 wagons and 250 diesel locomotives. Practically all these resources have been obtained on the Swiss market, which cannot alone cover the financing of Eurofima's needs. Recourse to other sources of capital will be essential.

An Informative Transport Congress

THE great progress made in the design and construction of motive power, rolling stock, signalling equipment and other railway material in Britain in the 40 years since the Institute of Transport was founded; the rapid development of all methods of moving goods by rail and road; and the complexity of the problems facing transport today were the most striking features of the Institute of Transport Congress held in London last week. This was the first of these periodical gatherings normally held in different centres in the British Isles, to take place in the capital since the war. The current year is the 40th since leaders of the transport industry, with the approval of the Government of the day, in 1919, set up the Institute, which was duly incorporated by Royal Charter in 1926. It is also the first year in which it is possible to see many concrete indications of progress in the modernisation and re-equipment of British Railways—in every Region of British Railways, and in every sphere of railway activity. These facts made the 1960 Congress a notable one, apart from the excellence of the arrangements and the quality of the papers read. A brief account of the proceedings is given elsewhere in this issue.

The interest of the present Government in the activities of the Institute was shown by the performance of the opening ceremony at the Waldorf Hotel, W.C.2, on April 27, by Mr. Ernest Marples, Minister of Transport, and by his presence as principal guest at the annual dinner at the Dorchester Hotel on the following day. The Minister emphasised, on Tuesday, that railways, whatever the losses they might be incurring for the time being, were essential to the national economy. He also pointed out that they could not pay their way, during the period of transition in which their plant and equipment were being brought up to date, and the system generally was being re-modelled to perform its function in a modernised transport system. His insistence on the far-reaching potentialities of the principle of propulsion embodied in the hovercraft as applied also to rail and other forms of land transport had been voiced by Mr. Marples before. His pre-occupation with this matter may, unfortunately, occasion misgivings in the mind of the Government as to the usefulness of a railway tunnel under the Channel, in view of the possibilities of the hovercraft. On Thursday evening, in expressing his determination to stem the tide of road accidents, he pointed out that one of the anomalies of the present situation, in which congestion of the roads in urban areas was increasing, was that much of the plant of railways was used only twice a day, in conveying people to and from their work. He also emphasised that Government departments were hampered, in their efforts to take quick and vigorous action by statutory restrictions. The subject of restrictions was one of those mentioned by Sir Gilmour Jenkins, lately Permanent Secretary, Ministry of Transport & Civil Aviation in his paper which he gave after the opening ceremony; this was discussed in last week's issue.

The two other papers, read on the Thursday morning, were by Sir Donald Anderson, Chairman of the Peninsular & Oriental Steam Navigation Co. Ltd., and a Past President of the Chamber of Shipping of the United Kingdom, and Mr.

Peter Masfield, Managing Director, Bristol Aircraft Limited, and President of the Royal Aeronautical Society, and were concerned respectively with sea and air transport. Sir Donald Anderson maintained that unless the Government established soon a domestic transport policy which included rail, road, and sea services, coastal shipping might disappear within a few years. The railways, he said, could run coastal shipping out of business by lowering charges on such cargoes as they carried, and they could do this without much affecting their own overall losses. Road transport was in even stronger competition for some cargoes. "It seems essential, therefore," he added, "that active support and protection, as part of a domestic transport policy, must be given to coastal shipping if it is not to disappear in a few years, and if it is to be properly used to supplement the road system." This was not a matter of sentiment or charity, he stated, any more than keeping the railways up to date was a matter of sentiment. "The country needs road, rail, and coastal shipping; but if it is to keep all three it must have a transport policy to enable each to do what it can do best." Sir Donald Anderson exaggerated the extent to which the British Transport Commission and British Railways lose on shipping services, many of which are profitable.

The evening functions included an informal reception by the President of the Institute, Mr. R. G. Grout at the Waldorf Hotel, and a more formal reception at Guildhall. Apart from the beauty and historic interest of this heart of civic government in the City of London, the holding of the reception there served to emphasise the links between the City and the transport on which enterprises in the City depend, and more particularly, perhaps, the General Steam Navigation Co. Ltd., an undertaking of which Mr. Grout is Chairman, with a long association with the Port of London. At the annual dinner it has been the custom in recent years to announce the name of the President of the Institute for the succeeding year, but because of the incidence of the dates of meetings, Mr. Grout's successor will not be elected until later.

The exhibition of British Railways motive power, passenger and goods vehicles, and containers, arranged specially for the Congress in Marylebone Goods Depot on two days last week, showed examples of design and workmanship by British Railways staff and workshops, and by private builders. The display was admirably planned by the London Midland Region in conjunction with the British Transport Commission. Those who visited it could see the extent to which, in the goods vehicles and containers, designers had co-operated with the commercial and operating staffs and others in contact with railway users.

Progress and achievements in electrification and associated civil engineering works, in the equipment of marshalling yards, and in signalling were perhaps the most striking features of the railway installations in and around London to which visits were arranged. In connection with a.c. electrification of the London Tilbury & Southend Line, Eastern Region, the extensive reconstruction of Barking Station and the new flyover could be seen. On the Great Eastern Line of the same Region the new electric car sheds at Ilford were on view, and something could be seen of the new marshalling yard at Temple Mills, which includes many applications of recently devised equipment. In the Southern Region facilities were given for inspection of the frame and relay room at Sittingbourne signalbox and the field station at Swale on the Kent Coast electrified lines. The Reading Signal Works of the Western Region afforded a comprehensive view of signalling practice and training. Other new developments in signalling were demonstrated in the London Transport Northern Line installation at Leicester Square. Methods of maintaining diesel motive power, and the care given to the design and layout of maintenance facilities could be seen in the Western Region diesel depot at Reading, where also were displayed examples of Western Region diesel locomotives and railcars and a railbus. On view in the London Midland Region was the carriage cleaning depot at Willesden, which deals with much of the passenger stock running on one of the busiest main lines in the world. These were only a few of the many items of interest in other spheres of transport, which afford instructive visits for all concerned with transport, as can be seen from the brief account elsewhere in this issue. There were also opportunities of seeing how active is the B.T.C. in producing documentary and other films and in preserving historical railway relics in the new depot at Clapham.

The smoothness with which the various parts of a full programme were carried out demanded a great deal of hard work, in the preliminary stages and later, by Mr. F. W. Crews, Secretary of the Institute, and his colleagues, and by the staffs of the British Transport Commission, British Railways, L.T.E., and the many other transport concerns which invited visits to their installations. They should be heartily congratulated. This efficiency, with the pleasant atmosphere of the several evening gatherings, the range of topics discussed during and after the papers, the variety of concrete examples of achievements in transport to see in a time of change and rapid development, and the opportunities of making and renewing friendships with people engaged in transport in Britain, and overseas, made the Institute of Transport Congress, 1960, a memorable event.

Buildings on Moving Ground

IN view of the great area of railway land in the United Kingdom situated above past, present, and future colliery workings it is remarkable that there is not more trouble from subsidence. Where the tracks are threatened measures are taken to fill in finished coal-workings, but even so speed restrictions and track-lifting are still necessary in places. The threat of damage to railway buildings from subsidence, though always present, is less in evidence. Nevertheless, the experience of local and other authorities in the design, construction, and maintenance of buildings built or to be built on ground liable to movement is of importance to railway engineers and architects. Although Britain is less concerned with building in earthquake-prone areas than are some other countries, it is often necessary to design buildings for erection on reclaimed ground and fills, in salt-mining areas, and above all coalfields; and experience in connection with the latter may apply in greater or less extent to the other conditions involving liability to ground movement.

Before the late 1950's the orthodox design of buildings in mining areas usually involved the use of steel and concrete foundations, and the separation of the structure into comparatively small parts with slip-joints between them. The theory was that each part would stand on its own foundation-slab, which would act as a cantilever whilst the ground settled and tilted. Once the movement ceased the slabs were expected to revert finally to the horizontal. The foundations often proved to be heavy and deep—or in recent cases of egg-crate formation—to secure maximum strength. The ground-beams were sometimes as much as 4-5 ft. in depth and were heavier than the buildings they carried. In spite of these precautions, adding on an average about 10 per cent to the cost of the building, waves of mining subsidences not infrequently caused serious damage to structures.

This situation led Mr. Donald Gibson, Architect to the Nottinghamshire County Council, to carry out exhaustive investigations into the whole subject, as outlined in a lecture to the Royal Institute of British Architects. After consulting many national and local authorities, he considered the effects of their opinions and deductions as applied to a critical case obtaining in actual conditions in Nottinghamshire. He found that to meet these conditions a building 200 ft. long should be able to become distorted out of square to the extent of $\frac{1}{4}$ in. in 10 ft. Also that, in addition to vertical movement, the ground may stretch up to 4 in. in 100 ft. when subsidence occurs. It was this horizontal movement that caused most damage and was the reason why deep orthodox specially-designed foundations increased rather than obviated the danger of damage.

Accepting the fact that subsidence would inevitably cause the ground to move and to stretch horizontally, it became clear that a building must be allowed to slide over this movement and at the same time be sufficiently flexible to meet the distortion. The result was a design embodying a slab-foundation only 5 in. thick or deep, with sufficient reinforcement placed centrally to prevent its parting company with itself, but insufficient to resist bending or cantilevering—in fact like a sheet of paper. The economic limit to the length of such a slab with purely tensional reinforcement is about 180 ft. for a single-storey and 140 ft. for a three-storey building. To insure that the slab in the earliest examples would be free to move on the soil, it was laid on waste colliery shale rolled with a vibrating roller; sand is also suitable. The 5-in. slab is

amply strong to carry the light superstructure necessitated by complete flexibility.

In fact, the superstructure consisted of a loosely-jointed steel frame capable of conforming to the subsidence waves as they passed through the ground. To be elastic in every direction it had to be in the form of a series of parallelograms in each direction, and the vertical stanchions had to rest on pins grouted into the ground slab. (In Belgium column-bases rest on rollers in trays on the foundation slabs). To give rigidity to the frame, it had diagonal steel bracings fitted in some of the bays with heavy springs at both ends of sufficient strength to resist wind-pressure and dead loads, but able to "give" when the ground waves occurred, yet controlling the building after they have passed. All these and other details in design had been subjected to exhaustive practical tests, and were embodied in a small pioneer building prior to being adopted as standard production practice.

The resulting buildings have side-hung windows—the type least likely to bind—and timber roofs and floors, the latter $1\frac{1}{2}$ in. thick carried on steel-frame members spaced at 3 ft. 4 in. centres. The walls are either tile-hung with dry jointing, of pre-cast concrete cladding, timber, or vitreous-enamelled steel sheet, or even of flexible mathematical tiling. Drains under the buildings being subject to separate individual movement are in spring pitch fibre and are in long lengths with few long-sleeve joints. Stack-pipes and other vertical drains are free to move in wide holes through or beside the main slabs. These buildings can be built in compliance with the lately-revised bye-laws and with fire regulations in any part of Great Britain. In Nottinghamshire the type has been widely adopted for new schools and other large buildings up to three storeys in height. Special consideration is being given to sites under which future coal-workings are planned.

A.R.E.A. 1960 Convention

THE 1960 convention of the American Railway Engineering Association was held recently in Chicago. Besides the usual reports of the 23 standing committees, addresses were given and discussions arranged. Among the subjects of the addresses were the possibility of "a track-reconditioning train," wheel-loads, fire-retardant treatment of timber, the challenges facing railways, asphalt treatment of ballast, clearance tests and depreciation viewed from various aspects. Panels also put forward subjects for discussion, such as standardisation in general and as applied to five basic turn-outs, pre-stressed concrete, and the training of machine operators and mechanics.

The panel responsible for the last-mentioned subject consisted of five railway officers and five representatives of machine manufacturers. Lack of trained operating and maintenance men is stated to be serious in some areas, and the various machines to suffer from inferior handling affecting the quantity and quality of the work they can do. The problem of training men is complicated by their having frequently to change their jobs and by the changing of the machines they have to work or maintain. Training schools at the factories producing the machines are suggested, and also instructional classes on the railways, held by employees of the manufacturers. The overhauling of the machines in the off-season in workshops also provides opportunities for the training of mechanics and operators.

Creation of a post of operator-instructor responsible for training all other operators and mechanics also has been proposed. The instructor must be not only highly skilled in all the machines concerned but also suitably qualified as a teacher who will allow no bad habits, and be able to impart knowledge necessary to extract the highest output and best work from each machine. It has also been suggested that the operator should go with his machine to the next job when the one in hand was finished, and stay on the new job long enough to coach the new operator from his knowledge and experience of the machine in its care and its maintenance requirements. Frequent visits by manufacturers' representatives to the works where their machines were in use are urged, as was the setting up by more railways than at present of comprehensive training programmes and facilities. Only so could adequate returns on the large sums invested in work equipment be expected.

LETTERS TO THE EDITOR

(The Editor is not responsible for opinions of correspondents)

Power for Air Conditioning

April 28

SIR,—I read with interest Mr. J. F. B. Vidal's letter in your April 22 issue. The figure of 25 kW. was given to us by the makers as the outside requirement to provide heating under maximum load conditions. We are indebted to Mr. Vidal for his further information contained in the second paragraph of his letter.

Yours faithfully,
L. F. R. FELL,
for Rolls-Royce Limited

P.O. Box No. 31, Derby

Chemical Weed Control on British Railways

May 2

SIR,—The article written by Mr. West of Fisons Pest Control, which appeared in your issue of April 8, surveyed a technical problem from a commercial aspect. Chipman Chemical Company is a service organisation whose products are not confined to any single chemical. Our policy is to test and select all kinds of chemical treatments for weeds, with a view to giving the best available product to British Railways, among many other users.

I find myself in agreement with much of Mr. West's article, though on three points I beg to differ:

1. Mr. West writes "in the total bill for weed control on British Railways the cost of the hand weeding component is at least four times as great as that for chemical." This implies that British Railways are maintaining a surplus of labour which is made available for hand weeding at a cost of more than £1,000,000 per annum. This is surprising.
2. It is suggested that "there is already evidence that it may be possible to space treatments at 18 month or two-year intervals." In no series of experiments we have conducted, including those with Simazin, have we been able to inhibit the growths of all weeds for more than twelve months at the rates under discussion.
3. It is stated that spray trains have not always given adequate cover in the cess. This can be misleading. Adequate cover can be given. It depends on the decision of the operator whether he applies sufficient chemical to the cess. The Chipman spray trains deliver any quantity desired and give complete coverage.

These are minor points of criticism. My main reason for writing to you is to correct three implications which, if accepted, can mislead your readers.

First, it is suggested that Weedex is a unique chemical which can produce results unattainable by any other chemical. This is not the case. Similar results are obtained by using monuron (known as "Telvar") or diuron (known as "Karmex").

Secondly, the factors involved in determining comparative costs are not as simple as they may appear from the article. British Railways (and others) are faced with the problem of allocating a pre-determined sum of money for annual weed control. The cost of using "Karmex" or "Weedex" at 10 lb. per acre would be 80 per cent higher than that of B.R. Specification on its own at present rates. This means that nearly half the track would have to remain untreated for another year in the hope that re-infestation is sufficiently controlled to cut out a year's spraying. All our up-to-date research shows that this standard of persistency is unattainable at the rates quoted.

Lastly, the use of insoluble organic chemicals without a different type of chemical in combination does not solve weeding problems. It can create a new one. We have seen tracks where careful experimental spraying with organic chemicals has controlled most grass weeds but has left behind broad-leaved species even more detrimental to the track than the original infestation. This is particularly evident when these organic chemicals have been applied in the autumn. Our experiments over many years prove that control of both types of weeds over a period of 12 months can be obtained by using a mixture of B.R. Specification (based on chlorate) combined

with 4 lb. of Telvar or Karmex to the acre. The cost is only 60 per cent of that of the insoluble organics (including Weedex) at 10 lb. to the acre. Furthermore, extraneous factors such as ballast disturbance and bacteriological reaction which can affect the effective persistence of a chemical from one season to the next are so varied that it is unrealistic to expect that any existing weedkiller at economic rates can make track sterile to weeds over a period of more than 18 months, except possibly when applied as a prophylactic treatment to clean stone ballast of a depth exceeding 15 in.

My comments above are based on the experience of weed-killing on railways which this company and its associates in the U.S.A. and Canada have gained over 20 years, reinforced by widespread experimental and trials work in conjunction with Plant Protection Limited and Du Pont de Nemours International S.A.

Yours faithfully,
R. C. JENNINGS
Sales Manager, Chipman Chemical Co. Ltd.

2, Caxton Street, Westminster, S.W.1.

Electric Working through the Channel Tunnel

April 25

SIR,—What is the merit in feeding the electrified lines in the Channel Tunnel from only two points near its ends? Surely what matters is to provide an adequate electrification system at minimum cost. You omitted from my earlier letter, published on April 1, to which Mr. M. A. Cameron replied on April 15, the statement that on the evidence of the article on the Victoria Line in your March 11 issue, the cost of increasing the diameter of the tunnels by the 2 ft. necessary simply to clear the 25-kV. overhead equipment would be about £20 million. It is hard to see how the nine or so sub-stations for a 750-V. d.c. conductor rail system could cost anything like so much, and the latter would have the advantages of cheaper rolling stock equipment and contact system.

As to using standard French locomotives, I am not keen to share occupation of the tunnel with large quantities of hot transformer oil without far greater fire protection than these locomotives possess. By the time these and other inadequacies are modified out of them they will no longer resemble standard locomotives and could certainly not come from a pool.

Yours faithfully,
T. R. HUME

8, Highlands Avenue, Leatherhead

Use of Available Routes

April 26

SIR,—Introduction of a diesel train service between Leeds and Sheffield via Wakefield and Barnsley, mentioned in your April 22 issue, is surprising only in that such changes have not been made sooner. Not until four years after nationalisation did trains from Bletchley start to use the Western Region station at Oxford. In 1956, Cromer High was eventually eliminated. In 1958, all trains started using one station at Stamford.

Another overdue improvement would send Western Region trains from West Drayton into a bay platform at Staines Junction, Southern Region, over the wartime connection. If this had been done some years ago the unattended signalbox would not have been set on fire; the cost of providing a new bridge over the former G.W.R. line for the Staines by-pass road would have been avoided; and a considerable economy would have resulted, with the improved receipts resulting from the better facilities.

A peak-hour train service has been advocated for many years between Clapham and Willesden Junctions via Olympia. Now a syndicate proposes a road over the railway. Perhaps a bus service along the proposed ring road will follow eventually.

Yours faithfully,
R. G. R. CALVERT

45, Woodwaye, Oxhey, Watford

THE SCRAP HEAP

Wantage Atomic Flier

A toy electric train is being used by scientists of the Atomic Energy Authority at Wantage, Berkshire. The model railway runs along 30 yd. of track into a concrete blockhouse. It has solved the problem of the Radiation Laboratory of how to collect samples directly from a lethal radiation beam. The equipment was bought from a toy shop for £7.

Broader in the Beam ?

To give passengers more room, arm rests are to be removed from the diesel trains placed in service early this year between St. Pancras and Bedford, in the London Midland Region, British Railways. A retired foreman of a French railway carriage manufacturing firm once told us that before each visit to the Continent by a V.I.P. from Britain, the saloon always used on these occasions had to be sent to the builders for the doors to be widened.

Diesel Troubles in Co. Clare

The West Clare Railway, the last narrow-gauge line in Ireland, and the one which was made famous by Percy French with the ballad "Are you right there, Michael, Are you right? Do you think we'll get there before it's night?" is again in the news. . . . The train left Ennis for Kilkee at 4 p.m., and when it arrived at Blackweir at 6.30 p.m. it stopped to let off a passenger. The driver brought the engine to a halt right across the nearby level crossing, and when the train refused to move, traffic on both sides of the road was held up. Impatient motorists kept hooting their horns, but not even a brass band would get the diesel to move. The

train had 11 passengers. Among them were three English visitors. . . . When it became clear that the train would not move, the three English visitors were taken the three miles to Kilkee by car. A motor-cyclist set off for Kilkee to get another car for the other passengers, but when he did not return they decided the quickest way of getting home was to walk. Mechanics from Ennis—45 miles away—did not get the train to move until 12.15 a.m. One of the passengers said afterwards: "It reminded me of the story about the old West Clare steam engine. When the engine gave up the guard was reputed to shout, 'First class passengers remain seated, second class get out and walk, and third class get out and shove.' While the English visitors obtained a motor to take them to Kilkee, we had to walk although there is only one class—second—on the line at present."—From the "Guardian."

Not Cricket

"The bridge is being built in connection with the new Bukonte cut-off railway, which aims at shortening the rail distance between Tororo and Jinja College by nine wickets."—From "The Uganda Argus," quoted by "Peterborough" in "The Daily Telegraph."

"Heavy Harry" Preserved

The Victorian Railways giant-size steam locomotive, *Heavy Harry*, is to be preserved for posterity. It will be placed on a short stretch of specially constructed track beyond the Wheel Shop at Newport Workshops, and within view of the Williamstown line. To enable the locomotive to be retained for historical purposes, it will receive the necessary

preventive maintenance to stop deterioration and restore its original appearance. When *Heavy Harry* was launched on its career at Newport Workshops on February 7, 1941, it was the heaviest and most powerful locomotive in the southern hemisphere and was described as "a mammoth engine representing a new milestone in Australian railway history." When the locomotive was removed from the register on April 30, 1958, it had travelled 821,860 miles on the fast goods service between Melbourne and Albury. It did the work of two engines, hauling on each trip the ruling grade load of 820 tons. The roadworthy weight of the locomotive was 260 tons and tractive effort 55,000 lb. The engine, with tender, is 92 ft. 6 in. long and the wheel-base 82 ft. 1 in. The eight coupled wheels are 5 ft. 6 in. in diameter and the water tank capacity of the tender is 14,000 gal. The coal capacity was 9 tons. It was also the first V. R. locomotive to be equipped with a mechanical stoker.

Sale of Ashes

In reply to a question in the Indian Upper House on February 16, the Deputy Minister of Railways stated that the sale of locomotive ashes to the public on all railways realised a sum of about £388,650 annually.

A.C. Equipment at Liverpool Street

Liverpool Street, terminus of the Great Eastern Line of British Railways, Eastern Region, will be the first main-line station in London to be served by electric trains operating on the 50-cycle a.c. system, when the electric services are inaugurated on the lines to Enfield Town, Hertford East, Bishops Stortford, and Chingford. The illustration shows overhead equipment in course of erection over roads between platforms 9 and 10, which are likely to be used by main-line trains, at first those to and from Clacton and Wakon-on-the-Naze.

Élégance Française

When returning recently from a skiing holiday, I had a good look at Lille at the latest type of French BB 25-kV. locomotive which had brought us all the way from Strasbourg. This locomotive appears to be similar to the new electric locomotive for the Crewe-Manchester service. . . . The French locomotive is of a more pleasing appearance—and this is due entirely to the clumsy arrangement of the windows in the cab of the British engine. The French locomotive has two window panes in front, and the side windows are sloped so as to provide an unbroken tapered line. The British cab has three windows in front, separated by heavy frames, and the side windows look "bashed in." . . . Those responsible for the design of our electric locomotives might give more thought to styling. After all, British steam locomotives, with the exception of the wartime "Q" austerity class, have always prided themselves on their graceful appearance. —From a letter to "The Financial Times."



Overhead a.c. electric equipment in course of erection between platforms 9 and 10 at Liverpool Street

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

SOUTH AFRICA

Meeting of General Managers

General Managers of the railways of Central and Southern Africa will meet in Johannesburg from May 20 to 25. The meeting has been arranged to coincide with the centenary celebrations of the South African Railways. Discussions will cover a wide field. Three matters to receive particular attention are standardisation of equipment, the interchange of information, and inter-railway goodwill. After the conference the delegates, as well as guests from the United Kingdom, France, Western Germany, and the Netherlands, will be taken on a rail and air tour of the Union.

Cape Town Station Construction

Work has started on another part of the new £5,200,000 Cape Town Station. It is the non-White station and concourse which is to be built over the Salt River end of the platforms. The work is being done under contract by W. Harper (Pty) Limited. The amount of the tender was £277,700. The work is expected to be complete by the end of next year. Non-white station facilities such as ticket offices and waiting rooms will be provided in two separate buildings straddling the tracks. Road vehicles will enter from the new Pirow Street bridge which will cross the station area towards the Salt River side. One of the two buildings will be for main-line passengers and the other for suburban traffic. It is proposed to open the new station in stages as the work is completed.

RHODESIA

Beitbridge Railway Ownership

The Federal Government is to transfer ownership of the Beitbridge railway to Rhodesia Railways. The section owned by the Government of Rhodesia and Nyasaland runs from the centre of the bridge on the Limpopo River to a terminus about one mile inside Southern Rhodesian territory. Rhodesia Railways' records of the proposal to build the link with the Transvaal over the Limpopo go back to 1921 although the bridge was not opened until August 31, 1929. From then, until the advent of Federation, the line was owned by the Government of Southern Rhodesia although it has always been operated by South African Railways as a part of its system.

Track Realignment

Rhodesia Railways is to realign 3½ miles of track to the east of Inyazura Station and to build a new bridge at the same time. Total cost of these works will be £75,470. It was at one of the sharper curves on this part of the line that a serious derailment occurred in August, 1957, involving loss of life and serious damage to two diesel locomotives and 15 wagons. On the present alignment there are 12 curves, two of them of 20 ch.

radius and the remainder ranging from two at 10 ch. down to two 6½ ch. curves. When the new link is completed there will be only five curves, two of 25 and three of 30 ch. radius.

The annual saving in running costs as a result of eliminating the sharp curves, improving the gradient and slightly reducing mileage is calculated at £6,280. Concurrent with the deviation, which itself will cost just over £42,000, a new bridge is to be built over the Inyazura River for £33,435, the present bridge being due for renewal. By replacing this bridge while the new line is being built additional expenses of providing temporary works at the present site have been avoided.

INDIA

Meeting on Transport Facilities

A Pakistan Government delegation headed by Mr. S. A. Suhrawardy, Chairman, Pakistan Railway Board, held discussions in New Delhi on April 14, with an Indian Government delegation headed by Mr. K. B. Mathur, Chairman, Indian Railway Board, on transport facilities between East and West Pakistan across the Indian railways and similar facilities between West Bengal on the one hand and Assam and Tripura on the other, across East Pakistan railways. After some preliminary discussions, the meeting broke up into committees to consider various aspects of the question further.

The members of the Pakistan delegation, who were guests of the Government of India, were Messrs. S. A. Suhrawardy,

Chairman, Railway Board; Mushtaq Ali, Financial Commissioner, Railway Board; Hamiduddin, Joint Secretary, Ministry of Interior; S. M. Abbas, Director, Inspection, Ministry of Finance; and Ataulah, Deputy Secretary, Ministry of External Affairs. The Indian delegation consisted of Messrs. K. B. Mathur, Chairman, Railway Board; Karnail Singh, Member, Engineering, Railway Board; Fateh Singh, Joint Secretary, Ministry of Home Affairs; Narendra Singh, Deputy Secretary, Ministry of External Affairs; and D. P. Anand, Member, Central Board of Revenue.

WESTERN AUSTRALIA

New Design of Sheep Wagon

A new type of railway wagon recently placed in service enables sheep to be carried by rail at passenger speed. A consignment of 200 sheep was recently loaded in the new van at Mullewa at 5.20 p.m. and travelled the 321 miles to Midland Junction arriving in time for the markets early next morning. A total of six of the new type sheep vans are being constructed in the Railway Department workshops at Midland Junction. They are being converted from the under-carriages of bogie cattle wagons on which are placed the bodies of two single sheep vans.

Improvements to the prototype wagon now in service will include the provision of a through race. This will enable sheep to be quickly loaded or unloaded through one door when a number of vans are coupled together. The design of the new wagon makes it possible to segregate

Standard Gauge Progress in Victoria



[Photo]

[Guy Bakewell]

Southern end of the first section of standard-gauge track to be laid, between Bowser and Wangaratta, with broad-gauge line on the left

separate consignments, and consequently the freight is charged only for the space ordered instead of for the entire van.

VICTORIA

Power Signalling Installation

Work has commenced on the installation of automatic power signalling from Blackburn to Mitcham at a cost of about £76,000. With the completion of this intermediate section, automatic power signalling will be in operation from Flinders Street to Ringwood. When the power signalling facilities become available, train services beyond Box Hill will be further improved. Power signalling is being installed in the station yards at Blackburn and Mitcham, as well as the main line. At Mitcham a new relay room has been built to house the electrical control gear. This involves alterations to existing station buildings. Foundations for a similar room have been laid at Blackburn.

Richmond Improvement Plan

The large-scale Richmond improvement plan, estimated to cost over £2,000,000 is entering the final stages. Designed to improve the capacity of the system and to dovetail into the proposed city underground railway, the Richmond project is the most important to be undertaken in the suburban area for many years. The plan provides for a new £60,000 station, five island platforms

(four of which have been constructed), and five pairs of tracks instead of three, to give greater capacity to the Caulfield and Box Hill lines and cater for stopping and express trains.

NEW ZEALAND

Lease of Land for Grazing

The New Zealand Railways last year received the substantial sum of £153,800 from commercial and grazing leases on some of the 45,000 acres of land owned by the Railways Department throughout New Zealand. The department has more than 9,000 leases, rights and easements on its land. Some of the more valuable leases bring in substantial rents. About 2,800 departmental leases are for grazing in rural areas. A new scheme, recently announced, encourages owners of land adjoining railway property to control and develop unused strips parallel to railway lines. The department has agreed to the moving in or building of fences away from legal boundaries, as close as possible to the lines.

FRANCE

Rail Transport of Goldfish

The S.N.C.F. has developed a new method of transporting live fish by rail. Previously they had to be moved in metal tanks which, because of the high

oxygen requirements, needed to be unduly large and cumbersome. The new method involves primarily the use of a plastic bag half full of water. Before closing the bag, oxygen is blown in under pressure, after which the bag is enclosed in a cardboard carton, the design of which has been approved by the Packaging Laboratory. This carton does not require special handling. The soft sides of the plastic bag prevents damage to the fish, while the movement of the train and of the fish themselves is sufficient to re-oxygenise the water. Trials were conducted involving the transport of goldfish for 24 hr. over a distance of 684 miles, which would have been virtually impossible previously, and no damage resulted.

SWEDEN

New Ferry Service

A new car-ferry service between Sweden and Denmark was inaugurated on April 8 by the Swedish State Railways and its associated company, Svenska Rederi A.B. It runs from the Limhamn, by Malmö, to Dragör, south of Copenhagen; and its advantage is that to reach it motorists to and from Denmark do not have to pass through Copenhagen. Five services each way per day are being operated until May 28, six from then until the end of June, and an increased service during the summer season. Sea passage takes 50 min.

Publications Received

Railroad Transportation and Public Policy. By Dr. James C. Nelson. Washington, D.C.: The Brookings Institution. London: Faber & Faber, 24, Russell Square, W.C.1. 9½ in. × 6 in. 512 pp. Price 54s. (\$7.50).—This is a detailed study of the anomalous position of the U.S.A. railroads. The author believes that they supply essential transport in conditions which seem to make commercial success almost impracticable, even amid general prosperity. The study has been financed by the Brookings Institution, an independent organisation for research and education in the social sciences. Although it is confined to the U.S.A., and to conditions prevailing there, with only incidental references to other countries, Dr. Nelson's comprehensive survey is worthy of examination by all concerned with the relationship between transport and public policy.

The Economics of Competition in the Transportation Industries. By John R. Meyer, Merton J. Peck, John Stenason, and Charles Zwick. Cambridge, Massachusetts: Harvard University Press. London: Oxford University Press, Amen House, Warwick Square, E.C.4. 8½ in. × 5½ in. 359 pp. Price 60s.—Four economists, two engaged in academic pursuits and two in industry, have collaborated in this analysis of the troubles of railways in North America. It accepts basically the desirability of a free-enterprise economy with private owner-

ship and commercially-successful operation, and a minimum of governmental regulation. The authors state that regulation has been used as a means of perpetuating some services that are unable to pay their costs, but are considered socially desirable. They consider that the abandoning of an uneconomic service would result in less harm than the maintenance of higher charges to subsidise unremunerative activities. As the term "uneconomic services" probably includes most high-density urban and suburban traffic, the social implications might be greater than any envisaged by the authors.

Industrial Directory of Wales & Monmouthshire. 1960. Fourth edition. Cardiff: The Industrial Association of Wales & Monmouthshire, Aberdare House, Mount Stuart Square. 9½ in. × 7½ in. 328 pp. Price 21s.—This work is intended to further the objects of the Industrial Association of Wales & Monmouthshire which include the fostering of industry and mutual trade within the area concerned, co-operation with other official bodies, the surveying of trends affecting production and export opportunities, the improvement of ports and road communications, and the pooling of research information and other facilities. Two principal sections show, firstly, a classified list of products and services offered and secondly, the addresses and brief particulars of the firms from which they can be obtained. Government offices, hotels, and chambers of commerce and

trade associations in Wales and Monmouthshire are listed additionally in separate classified sections. Although relatively small these may be found of greatest value to firms elsewhere in Britain and overseas needing to establish initial business contacts in what is now an area of extremely diverse industrial activity.

Tools for Vehicle Maintenance.—The 1960 catalogue of Apkoway tools published by J. W. Pickavant & Co. Ltd. includes many items designed specially for vehicle maintenance and the acceleration of heavy repair work by the most efficient means. It includes illustrated descriptions and full specifications of valve service tools, vehicle body repair equipment, clutch tools, hub pullers, and hydraulic pullers and extractors. General service tools are also included. Copies may be obtained from J. W. Pickavant & Co. Ltd., Bow Street, Birmingham.

Mixer-type Hot Metal Cars.—An eight-page publication produced to emphasise the economies and improvements obtained in practice with this type of Treadwell wagon compared with any open-top hot metal carrier. Designs to suit a wide range of plant requirements are shown. Capacities up to 300 tons are envisaged. Illustrations show how the iron is held in the cars until charging time, resulting in a heat conservation of the order of 150° C. Copies may be obtained from Head, Wrightson & Co. Ltd., Ship House, 20, Buckingham Gate, London, S.W.1.

Automatic Train Control in Western Germany

Transmission between track inductors and train on the three-frequency resonance principle

THE German Federal Railway in recent years has developed and extended automatic train control on its lines. The illustration shows single-phase 15,000-V. 16 $\frac{2}{3}$ cycles electric locomotive No. E40-139 after leaving the railway workshops at Freimann, Munich.

The main equipment was supplied by Siemens-Schuckertwerke A.G., and the A.T.C. apparatus of the Indusi pattern by Siemens & Halske A.G. This is the 1,000th locomotive to be equipped with this system of A.T.C., and to use the improved details designed since the war. The operating programme is, however, the same as that in use previously and reported to give very satisfactory results.

Method of Transmission

Transmission between the track inductors and the trains is effected on the three-frequency resonance principle. The train inductor radiates energy at 1,000, 500, and 2,000 cycles and at each distant signal there is one on the track tuned to the first named figure, but rendered ineffective if the signal is at "clear."

If it is against the train the driver must within 4 sec. actuate a "vigilance" handle or button, to acknowledge having seen the signal, upon which a yellow light appears before him and remains showing for 20 sec. If he fails to operate the "vigilance" control within the 4 sec., or thereafter does not bring his speed down below 56 m.p.h., a full emergency brake application will be initiated.

About 490 ft. in rear of the home signal is another inductor tuned to 500 cycles. If that signal is still at danger a similar brake application will result on passing it unless speed has been reduced below 40 m.p.h. At the signal itself is a third inductor tuned to a frequency of 2,000, and if the signal is, after all, overrun the emergency braking follows immediately.

This apparatus was the result of



Electric locomotive No. E40-139, German Federal Railway, after leaving the Freimann Workshops, and the 1,000th fitted with A.T.C. in its latest form

extensive investigations and practical trials conducted many years ago and became adopted before the war, though improved since in certain constructional details. At present it is in service on

some 3,800 miles of double line on the German Federal Railway, and 1,500 locomotives are fitted to work with it. Its use is being extended as opportunity and resources permit.

COOK'S ISSUE LARGEST DENOMINATION TRAVELLER'S CHEQUE.—The world's largest denomination traveller's cheque has been issued by Thos. Cook & Son Ltd., from May 2. It is for \$250 (about £90). The cheque is gold in colour and is in addition to the company's present issues of \$10, \$20, \$50 and \$100. It is the first dollar denomination to carry the signature of Sir John Elliot, the company's Chairman.

DIVERSION OF BOWLING-DUMBARTON LINE.—All trains between Glasgow Queen Street and Dumbarton, Balloch, and Helensburgh, British Railways, Scottish Region, now use a new route. A new rail connection has been built just west of Bowling and trains are being diverted through Dumbarton East Station, to Dumbarton Central Station. The trains diverted *via* this route do not call at Dumbarton East Station and there is only

a slight difference in running times. When electrification is introduced electric trains will call at Dumbarton East Station.

SCOTTISH REGION AMBULANCE COMPETITION.—In the final of the British Railways, Scottish Region Ambulance Competition held on April 26 at the St. Andrew's Ambulance Association Headquarters, Glasgow, Bridgeton team won the Scottish Railways Shield. Ten teams competed. The first three teams were: Bridgeton (444½ points), Perth (410) and Cathcart & Muirend (409). In the preliminary stages 51 teams took part in the competitions held in districts throughout Scotland. An ambulance competition for women railway employees was held on the same day. Three teams took part and Falkirk Women's team won the silver rose bowl with 404 points. Mr. James Ness, General Manager of the Region, presided,

and the prizes were presented by Mrs. Ness. The Bridgeton and Perth teams, with the Falkirk Women's team, will represent the Region at the British Railways Inter-Regional Competition to be held in London on June 9.

N.E. ENGLAND TO DOVER CAR/SLEEPER TRAINS.—The car/sleeper services between Newcastle and York and Dover in connection with the Dover/Boulogne car-carrier service, are now available to motorists travelling to and from Dover only. This facility aids motorists who otherwise would drive long distances between the North East and holiday resorts in Kent and East Sussex. The service from Newcastle and York to Dover will be by a train running every Wednesday from June 1 to September 21, and on Mondays, from July 18 to August 22, with corresponding return services on Thursdays from June 2 and Tuesdays from July 19.

British Transport Hotels

An outline of the efforts which are being made to continue, and improve on, the service which has been given in the past by the "Railway Hotels"

By E. J. Vacher,
Chief Hotels Manager,
British Transport Hotels & Catering Services



Dining-room of the Great Western Royal Hotel at Paddington

ellers with all they may require by way of good accommodation, elegance of surroundings, a spirit of service and the suitable means of entertainment of guests.

Facilities are also provided for the business community of the district; in fact, many of our hotels are now considered to be the social centre of the localities in which they function. Their reputation and the esteem in which they are held by their discerning patrons are an indication of the success of the policy which is being pursued to keep them well to the fore of the hotel industry.

Heavy Costs

To keep hotels abreast of modern developments and changes in custom and taste is expensive, but this is a *sine qua non* of progressive hotel-keeping. The task today is to overtake the obsolescence of yesterday and, at the same time, to plan ahead. This progressive policy must be pursued and yet the day-to-day operation of hotels must continue. In this respect, hotels such as the Midland at Manchester, the Adelphi at Liverpool, the Central at Glasgow, and the North British and Caledonian at Edinburgh offer typical examples of this forward planning and adaptation.

Between the two wars, the reconstruction of Leeds City Station gave the L.M.S. the opportunity of overtaking the obsolescence of the old Queen's Hotel by incorporating a new hotel. The L.N.E.R.

SINCE the end of the first war a spectacular expansion has taken place within the hotel industry in Europe and the Americas. It is advisable, therefore, to consider the present position of the chain of hotels operated by the British Transport Commission through one of its Divisions—British Transport Hotels & Catering Services.

These 36 hotels represent a very considerable inheritance from the several railway companies which were merged under the nationalisation of transport, and my purpose is not to write of past achievements—important as they were—but to outline the policy which prompted the efforts required (and which are still being made) in order that these hotels may be not only worthy of their past, but, in fact, a leading example to the hotel industry of this and other countries.

Modernisation a Necessity

At the time of nationalisation, most of the railway hotels (several of which were requisitioned during the war), in varying degree, possessed one thing in common—the pressing need to overcome obsolescence.

No-one can seriously question the value to a railway and transport organisation of hotels well conceived and actively operated, having regard to good service, comfort, and the care of travellers who, for over a century, have come to look on railway transport as the hallmark of such consideration. Hotels were provided by the various railway companies in Great Britain with this aim in

view. Naturally, as the years passed, economic conditions changed and some cities and towns have expanded. In all appropriate cases railway hotels have had to be adapted to changing circumstances; hence, today, the existence of 36 hotels still popularly known as "Railway Hotels," which provide trav-



American Bar of the Great Western Royal Hotel at Paddington



Newly-altered and re-decorated lounge of Caledonian Hotel, Aberdeen

carried out extensive alterations and adaptations at the Royal Station Hotel, Hull, as did the Great Western Railway Company at the Great Western Royal Hotel, Paddington, among other hotels of its group. Today, the British Transport Commission has authorised preliminary investigations and *ad hoc* studies of problems connected with the replacement of major hotels essential to the economic and rational balance of transport and to the economic life of the cities where they are situated.

It is always easy to find critics who consider all activities in the transport

world in a superficial and uninformed manner, but the facts speak for themselves. The ever-increasing patronage of the British Transport hotels, the obvious progress in their standards of furnishing, decoration, and furniture, and the undeniable spirit of service shown by carefully-selected staffs, are all proof—if proof were needed—of the validity of the claim made on behalf of these hotels that, integrated as they are in the British Transport system, they form the spearhead of the hotel industry in this country as well as in Europe.

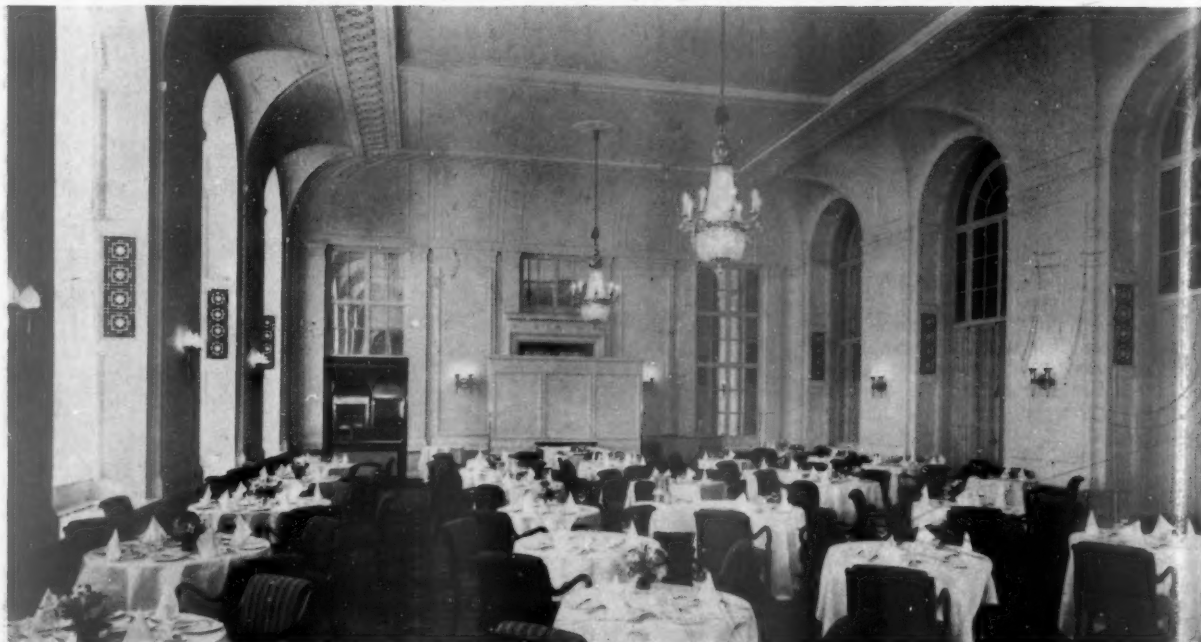
It may be a matter of particular

interest to note that in France, for instance, in the case of hotels that were formerly operated by the railway companies and which were later sub-let to privately-owned companies, steps are being taken at present to influence the managerial policy by means of new boards so that obsolescence may be overtaken and a more active course of action adopted—the very policy pursued by the British Transport Hotels & Catering Services and now about to reach full development.

Development

In addition to the vast schemes of rehabilitation of hotels, British Transport Hotels Services has pursued a development policy suitable for each hotel, based on full use of space for operational or commercial purposes. This has led, in some cases, to the complete alteration in character and purpose of public rooms, and in other cases to the creation of new restaurants or popular dining rooms. These efforts are not confined to restaurants or public rooms; a programme of improvements in bedroom accommodation by the provision of new private bathrooms is also in active operation in most of the hotels. If one considers the difficulties of carrying out these alterations and adaptations with the minimum of disturbance to hotel guests as well as maintaining the economic life of the hotels, one can easily imagine how carefully all operations must be planned.

These endeavours, spread over a period of time, will bring their own reward, and it can be confidently stated that the hotels operated by the British Transport Commission have an assured future. They will continue to serve the public and at the same time be maintained at the high level the hotel industry has come to expect from the "Railway Hotels."



The Sefton Grill of the Adelphi Hotel, at Liverpool

Numerical and Letter Codes on Railways

The use of numerical codes to facilitate railway working has developed to cover a variety of departmental needs

(By a correspondent)

IN every European country save Britain, train identity numbers appear at the head of the columns in the public timetables, and it is quite common for both public and staff alike to refer to a train simply by its running number. The principle of numbering trains has generally only applied in Britain to passenger trains at bank holidays or other times of peak traffic. The significance of these train numbers is normally only known to operating department staff.

Passenger Train Headcodes

With the increase of multiple-unit trains, the use of alphabetical and numerical headcodes to denote routes or stations served will doubtless be extended, and the combinations used are likely to be dictated by local needs.

Most regular travellers using British Railways, Southern Region, electric or diesel-electric services, will be familiar with the numerical headcodes applicable to their own particular services. A column denoting the headcode applicable is provided on the train departure sheets at Charing Cross, Cannon Street, and London Bridge Stations.

Other purposes for which numbers are allocated in Britain indicate enginemens' duty schedules and rolling stock set working arrangements. Such numbers usually take the form of black figures printed on white paper which is pasted on to a board or window as the case may be. A notable exception is the boldly painted (white on black) metal plates used by the Western Region to indicate train numbers at times of peak traffic.

The routing and transit of parcels and "small" consignments is greatly facilitated by the use of code numbers and/or letters.

The French National Railways (S.N.C.F.) have used, since shortly after the last war, a system of numerical codes, supplemented by self-evident indications of place names, as a means of rationalising the movement of packages.

Parcels Traffic Codes

British Railways also, since 1950, has used a system of code numbers to simplify the transit of parcels traffic. Basically, both systems depend on the staff at the forwarding station inserting the appropriate code on the parcel so that intermediate transfer stations need only sort traffic by number and do not require to read the entire address.

Whilst railwaymen and kindred workers may have a more highly developed geographical knowledge than many, it is manifestly impossible to expect even the most skilled to know both the exact location and the most favourable route to all the many and varied destinations served by a complicated European railway network. A comprehensive index of all stations served therefore is a

feature of both the British and French systems, so that the appropriate code can be readily ascertained and the package marked accordingly.

S.N.C.F. "Waggonage" System

The *Waggonage* system used by the S.N.C.F. is based on a geographical division of the whole system into zones. Each zone has its centre station and usually two other subsidiary stations to act as final distribution points. These latter are given a code number suffix. The complete code is made up of a regional prefix number, a bold geographical indication and a suffix number according to final destination. The regional prefixes are 1=Région de l'Est, 2=Région du Nord, 3=Région de l'Ouest, 4=Région du Sud Ouest, 5=

N12301	
De	PERPIGNAN
à	SOULTZ-LES-BAINS
1 SARREBOURG 31	
Partie de colis	Date

Fig. 1—Typical S.N.C.F. sorting slip

The geographical indication in the routing code is the zone centre for the

Station	"Waggonage" Code	Distance	Tariff Numbers
A			
Abancourt	2 AMIens 14		
Abbaretz	3 RENnes 43		
Abbeville	2 AMIens 20		
Airvault Gare	3 THOuars 18		
" Ville	3 THOuars 18		
Aiserey	5 DIJon 16		
Aisy—Villars	1 VESoul 14		
Aix-en-Provence	5 MARseille 30		

Fig. 2—Part of French National Railways station index of "waggonage" code

Région du Sud-Est. Routing slips are made out at the despatching station and show both originating and destination stations, as well as the routing code (Fig. 1).

destination, and the suffix number denotes the zonal sub-centre to which the package is finally directed.

This labelling system possesses the merit of having a generally well-known locality

Booklet 1 Regular or Conditional Loadings Within the South Eastern Region

Wagons Nos.	Forwarding Arrangements			Loads for	Remarks
	Route	Train Nos.	Day		
CD 7105	APT Cavaillon	9746	A	5 LYOn 20, 5 Le Voulte	} Tranship at Cavaillon
		9752	B	5 AVIgnon 10, 13, 14, 40 to 44, 50 to 53	
	Avignon NIMES	4691	C	5 MARseille, 5 NICE, 5 TOULon	
			C	5 NIMES, 5 MONTpelier, 5 ALEs	
CD 7125	AVIGNON	4420	A	5 CHAMbery	
		4426/25	B	5 BELlegarde	
	Aix-les-Bains ANNECY	4619	B		
			B		

Fig. 3—Extract from S.N.C.F. Booklet No. 1, showing S.E. Region services

appearing in bold characters which, if its location is not actually known to sorting staff, at least its destination region is readily identifiable by the relevant prefix number.

The two together serve to indicate throughout the greater part of the transit the best means of forwarding the package.

Suffix Numbers

Furthermore, when packages approach their final zone centre the suffix numbers assume greater significance as, if whilst sorting packages it is noticed a number of them have a suffix number beginning with the same figure, these can be grouped together for the final zonal sub-centres, for example:—

"1 SARREBourg 10" indicates Sarrebourg itself.

"1 SARREBourg 11-17" represents other stations in the Sarrebourg centre area.

"1 SARREBourg 20" represents Nutzelbourg and its surrounding stations.

"1 SARREBourg 30-34" represents Saverne and its sub-centre stations.

With practice, handling staff will soon develop familiarity with the part of the code with which they are most concerned, and so can sort all packages speedily and accurately.

Forwarding Tables

Coupled with the 72-page index book (Fig. 2) providing the *wagonnage* code for insertion on the labels, are supplementary instructions and forwarding tables to assist both transit and despatching points to handle their traffic expeditiously.

All despatching stations are provided with a booklet showing regular forwarding details for each Region (Fig. 3) and a loading table for both regular and supplementary, i.e. "as required" wagons.

The last mentioned documents are specially prepared to suit the individual needs of the several despatching stations (Fig. 4).

It is a feature of the service provided that the regular wagons shown will in fact operate irrespective of the load offering. It is, therefore, a dependable basic service on which additional wagons can be superimposed should traffic requirements justify such steps. Arrival dates can be quoted with confidence, a valuable commercial asset in competing with other forms of transport.

Numerical Sorting of Parcels

As with the French system, that used by British Railways is based on a geographical zone scheme with the object of ensuring that parcels reach their destination by the quickest and best means with minimum handling. The London Midland Region has 79 zone centres, the Scottish 28, the Eastern 74, the North Eastern 21, and Western Region 22 zones, whereas Southern Region stations are indicated by five-letter codes according to the particular district of the Region in which they are located.

Although these codes do not in fact provide a suggestive geographical indica-

"Wagonnage" Table for Frontignan Station			
Date.....			
"Wagonnage" Code	Forwarding Designation		
	Regular	Suppl.	Tranship point
All prefix 1	CT 9805		Dijon-Porte Neuve
All prefix 2	CT52950		Le Bourget
3 ANGers			
3 NANTES			
3 NIOrt	CT54646		Bordeaux St. Jean
3 SAIntes			
3 THOuars			
All other prefix 3	CT 9830		Lyon Guillotière
4 ANGoulême			
4 BORdeaux	CT54646		Bordeaux-St. Jean
4 PERigueux			
4 POItiers			
5 BESançon			
5 DIJon	CT 9805		Dijon-Porte Neuve
5 DOLe			

Fig. 4—Part of "wagonnage" table for Frontignan Station, S.N.C.F.

tion to the same extent as the French system, the fact that L.M. and Scottish Region zone centres are allocated numbers from 1 to 86 and the Eastern and North Eastern Region zones appear in the 100-199 group is immediately evident: Southern and Western Region codes are

book also includes an appendix indicating the rail zonal stations for London postal districts.

No other instructions or loading tables are necessary and as the system is confined to passenger train traffic there are normally fast and frequent services

Destination	Forwarding towards				
		N	S	E	W
Old Trafford	18				
Ollerton		137	135	135	
Olney	60				
Olton	W22				
Omagh	71X				
Ongar	150				
Onibury	W23				
Onich	74				
Onllwyn	W5				
Orbliston	76				
Ordsall Lne	19				
Ore	SE				
Oreston	W16				
Ormside		41	27T	27T	
Ormskirk		23T	25T		25T
Oxted	SC				

Fig. 5—Extract from British Railways numerical sorting system booklet

prefixed by the letters "S" and "W" respectively.

A 63-page index book (Fig. 5), is issued to stations and the appropriate zone numerical code is ascertained from this, and inscribed boldly (usually with a black crayon) on the package as near the address label as possible, on receipt.

Local traffic which is internal to a zone is not marked and is sorted according to its address label. The instructions in the index book are brief and simple and the

to dispose of the traffic currently. There is little doubt that the system is effective in view of the expanding parcels traffic figures.

This is not an attempt to compare the virtues of two different systems, as one is designed for freight traffic and the other for passenger train traffic, but to indicate the way in which code letters and numbers by careful selection can be used to facilitate aspects of handling goods and parcels traffic.

- N.B. (i) The letter X after a zone number indicates an ex L.M.S. station where parcels are transferred, but it is not a letter sorting centre
- (ii) The letter T after a zone number indicates transfer and is used to enable transfer traffic to be sorted and loaded separately where possible
- (iii) Where alternative numbers are provided, these are for use according to varying directions of forwarding, i.e., northwards, southwards, etc., and stations are required to select the number most suitable to their individual geographical position and train services and insert the appropriate number in the first column which has been left blank for the purpose.

ELECTRIC RAILWAY TRACTION SECTION

Aluminium in Electric Stock

FOR some years railway engineers have recognised the advantages of aluminium in rolling stock construction, and increasing use is being made of the metal, particularly as a means of decreasing weight and reducing maintenance procedure. In a development bulletin published by Aluminium Laboratories Limited entitled "Aluminium in Railways" the status of aluminium in railway rolling stock engineering is examined, some current applications are presented, and future possibilities are considered. It is suggested that high-density railways which operate within and sometimes between large cities form an attractive application of aluminium if only because conditions are particularly favourable to light-weight construction. Most of the systems are electrified and consist of short runs between stops. For this reason and because of the high traffic density the rolling stock used must be capable of a high acceleration and braking performance. Under these conditions a reduction in weight is directly reflected in the energy consumption, so that it is often possible to establish beforehand the power economies that can be achieved by a given investment in aluminium.

An outstanding example of the use of aluminium on a large scale for electric rolling stock construction is provided by the new trains built for the London Transport Executive. Formerly the cars operated by this undertaking were constructed in mild steel and when the ordering of new stock was under consideration the relative merits of mild steel, stainless steel, and aluminium alloys were investigated. As a result it was decided to build 90 new cars of aluminium for the District Line. This order was later supplemented by a further 13 cars. The extra capital cost was estimated to be more than covered by the expected saving in energy consumption and wear on brake blocks.

The cars are 51 ft. 1½ in. long overall, 9 ft. 8½ in. in maximum width, and 11 ft. 9½ in. high from rail to top of carlines. The weight on rails is 26.65 tons, the seating capacity 40 passengers, and the maximum passenger load 192 people (12 tons). The bogies and wheels are of steel, but the whole of the body, structure is of aluminium, chiefly in 51S alloy. The coaches are of the stressed structure type and similar in appearance to the existing steel coaches. By substituting aluminium alloys for steel the weight of the body complete with equipment, seats, and finishings was reduced from 17 tons 16 cwt. to 11 tons 5 cwt., a saving of 6 tons 11 cwt., of which 5 tons 15 cwt. was contributed by the body structure and 13 cwt. by the brake gear, doors, electrical equipment, and so on. Thus the weight saving is 37 per cent for the car body, equipped, and 20 per cent for the car complete with bogies and motors.

The construction of these cars has afforded an opportunity for the L.T.E. to test their performance against similar steel cars of the same capacity. Such cars may be designed to have the same run time as steel cars, with a lower energy consumption, or a shorter run time. The present vehicles were designed to have higher acceleration and braking performances so as to cover the given distance in the same time, but at lower maximum speed with reduced energy consumption.

A loaded four-car aluminium train was tested against a similar steel train over a half-mile distance between Acton Town and South Ealing on the London Transport District Line. Readings of speed, acceleration, and braking times were taken, the tests being made at varying motoring distances. The weight saving was 14.3 per cent and the reduction in energy consumption 12.4 per cent. For these cars the reduction in energy is 0.075 kW/mile/ton of weight saved. This can be translated directly into energy costs. The annual cost of electricity used by the L.T.E. is £3,500,000 so that a saving of 12½ per cent, or one eighth, represents a significant economy. In addition, the reduced maximum current means that there is less demand on sub-station and generator capacity.

In addition to the District Line aluminium cars, the L.T.E. placed in service in 1957 three prototype steel trains with unpainted aluminium outer panelling. The success of these trains can be gauged from the fact that 532 cars were ordered

to make up 76 seven-car trains for the Piccadilly Line. The first few of these trains are now in service. They show a saving of half-a-ton of deadweight per car and eliminate over 600 lb. of paint, while reducing cleaning costs substantially.

A symposium on the use of aluminium in railway rolling stock is to be held jointly by the Institution of Locomotive Engineers and the Aluminium Development Association, under the Chairmanship of Mr. R. A. Smeddle, President of the Institution of Locomotive Engineers, on May 27, at the Institution of Mechanical Engineers. Of particular interest on the subject of aluminium in electric stock will be a paper to be presented by Mr. A. W. Manser, Chief Mechanical Engineer (Railways), London Transport Executive, and Vice-President of the Institution of Locomotive Engineers, entitled "Experience with subway rolling stock."

Electrification Progress in India

THE progress being made with electrification on Indian railways at 25 kV. 50 cycles a.c. and the emphasis being placed on the use of Indian materials and trained man-power was stressed recently by Mr. H. D. Awasthy, General Manager & Chief Engineer, Railway Electrification, Indian Railway Board.

The Rajkharswan-Dongoaposi branch, with 45 route miles of double line carrying iron ore, has been selected as one of the pilot sections. A short length of track near Kendposi was energised and the first a.c. locomotive made its inaugural run on December 15 last year when members of the Permanent Commission of the International Railway Congress Association visited Calcutta after their meeting in New Delhi. A length of about 15 route miles was energised early in March this year for carrying out trials on a.c. locomotives.

The second priority section to be electrified is the Asansol-Dhanbad section with a route mileage of 38. The sub-station which will serve this section is being set up at Kumardhubi making use of some 25-kV. equipment obtained from the French National Railways by the Railway Electrification Administration. Both these sections are likely to be commissioned by the end of June. In another two months, therefore, it is expected that over 80 route miles would be operating on the 25-kV. a.c. system. Trials on these sections will not only allow driver training to proceed, but will also provide valuable data on the efficiency of the equipment designed in India.

The progress of works in all the sections in phase I of the scheme, is well advanced. Half of about 31,000 foundations for structures have been cast and masts erected. A number of ancillary works, such as construction of new electric locomotive sheds, raising of bridges and alteration to tunnels to provide the necessary electrical clearance, and staff quarters to house the traction staff have almost been completed.

A major part of the electrification work is directly carried out by Indian engineers and the responsibility for the entire scheme is that of the Railway Electrification Administration. Unlike the earlier tenders for sections under phase I, the work of designing the overhead equipment for phase 2 has now been undertaken by the Railway Electrification Administration which has resulted in reducing costs and saving in foreign exchange. It has been stipulated in all the contracts for overhead equipment that maximum use shall be made of indigenous labour and products.

The Railway Electrification Administration has been making sustained efforts in locating and encouraging indigenous industries. A railway galvanising plant has been set up at Chittaranjan, and from the time it was commissioned in May, 1959, over 11,600 steel masts have been galvanised. For the first time, copper contact wire and cadmium copper catenary wire have been manufactured in India.

Despite innumerable difficulties, not the least being the new technique in a.c. electrification, satisfactory progress has been made, and it is confidently expected that the railway electrification scheme will not fall short of the targets set for the Second Five Year Plan.

Single-Phase Co-Co Locomotives for U.S.S.R.

French-built rectifier design, with regenerative braking in 10 units out of 50, for goods and passenger service on the Trans-Siberian Railway



Single-phase 6,000-h.p. locomotive built by Alstom for U.S.S.R. 5-ft. gauge lines

TRIALS in the U.S.S.R. have been supervised by French engineers of the first of 50 single-phase locomotives built in France for the section of the Trans-Siberian Railway which is being electrified at 25 kV., 50 cycles. This section will extend eventually from Marinsk to Irkutsk, 915 miles, and includes conversion of 160 miles which were electrified previously at 3,000 V. d.c.

Goods and Passenger Types

The 50 locomotives are being built by the Société Alstom and the M.T.E. (Matériel de Traction Electrique) Group (S.F.A.C., Schneider-Westinghouse, and Jeumont). All are similar in wheel arrangement (Co-Co), dimensions, and their ignitron rectifier traction equipment, but the series has two main sub-divisions consisting of 40 locomotives for goods and 10 for passenger traffic, differing in motor suspension and gear ratio. The goods locomotives are sub-divided into a class of 30 (Class "T") and a class of 10 (Class "TP") which is similar to Class "T" in all respects, but with the addition of regenerative braking. This is believed to be the first time that regeneration through rectifiers operating as inverters has been used in a main-line locomotive.

Twenty-five 25-kV., 50-cycle locomotives were also supplied by Alstom in collaboration with M.T.E., to the Chinese Republic Railways. Except for the gauge,

5 ft. in Russia and 4 ft. 8½ in. in China, these are practically the same as the design for U.S.S.R. Tests on the electrified lines of the Northern and Eastern Regions of the French National Railways were made with a Russian locomotive mounted on the first two bogies for the Chinese machines; the orders were placed respectively in 1957 and 1958. The locomotives were not built right up to the generous dimensions of the U.S.S.R. loading gauge, but are 16 ft. 1½ in. high with the pantographs down; when the Chinese bogies are fitted this height is lowered appreciably.

Classes "T" and "TP" both weigh 138 tonnes and are driven by Alstom normal nose-suspended motors through gearing giving a maximum service speed of 62 m.p.h. The passenger locomotives weigh 120 tonnes and have similar motors driving through Alstom floating ring transmissions and geared for 99 m.p.h. maximum. Motor gear ratios are 16 : 71 for the goods and 25 : 69 for the passenger locomotives. Dimensions are the same for all varieties :

	ft.	in.
Gauge	...	5 0
Length over buffers	...	75 8
Maximum body width	...	9 9
Overall height (pantographs down)	...	16 2
Wheel dia.	...	4 1
One-hr. output	...	6,335 h.p.
Continuous output	...	6,000 h.p.

Starting tractive effort provided by the electrical equipment at 50 tonnes (110,000 lb.) in the goods locomotives, equal to 36 per cent adhesion, but in the passenger units is limited to about 31 tonnes (68,500 lb.), or 22½ per cent adhesion. In each case, the power available permits of these wheel-rim tractive efforts being maintained up to considerable speed, to about 26 m.p.h. in the goods and 43 m.p.h. in the passenger units. Continuous rated wheel-rim tractive effort in the goods units is 35.4 tonnes (78,000 lb.) at 28.2 m.p.h., and in the passenger 22.1 tonnes (48,500 lb.) at 46.6 m.p.h., both these values being in excess of the specified values, and equal to 5,875 r.h.p. and 6,025 r.h.p. respectively.

Mechanical Portion

Much use has been made in the mechanical portions of normal Alstom locomotive practice. In particular, the bogies have the double-cone rubber twin pivots with spring control of lateral movement, and the axleboxes have the Alstom thrust arms with Silentblocs to take up all fore-and-aft thrusts and lateral forces without the use of axlebox guides. The suspension system is compensated down each side and comprises a laminated spring below each SKF roller-bearing axlebox and a helical auxiliary spring at each end.

Above each compensating-beam fulcrum is an Alstom spring-supported side

bearer through which the superstructure weight is transmitted to the bogies, but in the goods locomotive the support and spring are double above one of the compensating-beam fulcrums on each side, giving three points of support on each side instead of two, as in the passenger locomotive.

A side bearer consists of a ball-ended vertical rod which acts in conjunction with a surrounding helical spring carried on a fixed support on the bogie frame, but two on each bogie in the passenger locomotive, and four in the freight locomotive, have a manganese-steel sliding frictional face between the top ball-end and the underside of the locomotive superstructure. Particularly in the goods locomotives, the position and arrangement of the side bearers had to be chosen in relation to the location of the traction motors and to counter the transfer of weight from one axle to another, and from one bogie to the other, during exertion of high tractive efforts.

Weight Distribution

As a result, on the goods locomotives, 19 tons of the superstructure weight rests on each pivot and 21 tons on the side bearers of each bogie. The bogie frame is a substantial welded box section with the end headstocks of large-diameter cylindrical section. Weight of a bogie of one of the goods locomotives without regenerative braking is 29 tons, including the three nose-suspended traction motors. Each bogie carries four horizontal air-brake cylinders actuating two double blocks on each wheel through clasp rigging.

Though the superstructure is in the form of a self-supporting box, entirely welded, the need for large Mifilre panels on the side walls to deal with the large amount of air incoming for the transformer and traction-motor ventilation, and for the warming of the interior during Siberian winters, has brought about a modification in the normal design of side framing and the provision of a supplementary roof structure over much of the length. The two large driving cabs are fully insulated against heat and cold, and are connected by one side passage fully protected from the electrical equipment.

Heating

The unusual length, some 10 ft. more than the S.N.C.F. "7100" class, which they otherwise resemble in body construction and bogie design, reflects the special provision for working in extremes of temperature (-58°F. to $+104^{\circ}\text{F.}$). The two end compartments in the body are pressurised; the incoming air passes over heating coils in winter. For winter running the air discharged from the traction motors is returned to the pressurised compartments instead of being exhausted to atmosphere. When entering service in winter, all external air intakes are closed and the traction motor blowers draw air from and return it to the body interior, so that the machines warm up rapidly.

The central compartment of the body, which contains the transformer, is at low pressure and the air which enters has already gained heat from the rectifier coolant and transformer oil systems. Liquid cooling of the rectifiers has been preferred because of its convenience in regulating the rectifier operating temperature by varying the proportions of coolant which are passed through the radiator or re-circulated direct.

Heating in the driving cabs is designed to maintain an interior temperature of 50°F. when the outside temperature is -58°F.

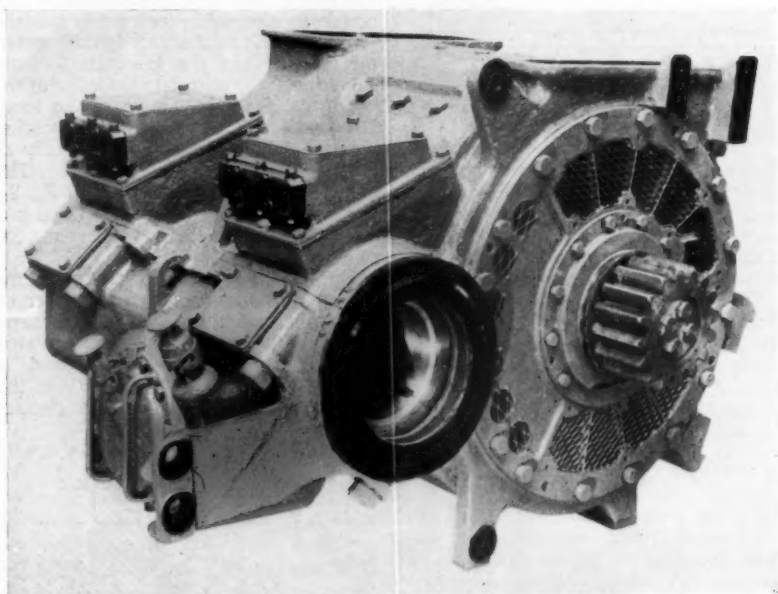
Electrical Portion

The power circuits are on the same principle as those used by Schneider-Westinghouse on the well-known Bo-Bo single-phase locomotives of Classes "12000" and "16000" on the French National Railways, and known as the

with Silentblocs, and the two outer motors are hung towards the centre of the locomotive and the inner motor is hung towards the buffer beam. In the freight locomotives the traction motors are of normal nose-suspended type and all are hung towards the centre of the locomotive.

The gear wheel, which is on one side only, is resilient, with inserted helical-steel springs. These d.c. force-ventilated motors have an individual continuous rating of 750 V. 1,080 A. 910 r.p.m. 1,000 h.p.; and on the one-hour rating 750 V. 1,135 A. 890 r.p.m. 1,050 h.p.; but the motors also are expected to be able to take a tension of 900 V. for long periods, and also at starting and in accelerating up to 25 m.p.h. to take currents up to 1,600 A.

A principal feature is that to enable them to operate in the Siberian winter climate, as well as in the summer heat,



Alsthom 1,000-h.p. 750-V. force-ventilated motor

push-pull system. Regulation of current to the traction motors is through a high-tension Jeumont main transformer, cooled by pressure circulation of oil, and fed by an auto-transformer through a 32-notch C.E.M. graduator. The motors are connected to the secondary of this main transformer through the intermediary of 12 ignitrons, arranged two per motor, and with return to the centre point. The two ignitrons for each traction motor rectify the alternating current into d.c.; also they play the part of main contactors. Three air-operated double reversers control pairs of motors.

Traction Motors

Passenger and goods locomotives have the same six-pole traction motors except for the suspension and the resulting changes in the carcase. In the passenger units the motors are entirely spring-borne and torque is transmitted through the Alsthom form of individual axle drive

a Class "H" insulation is used; and laboratory cold-chamber tests were undertaken in France to observe operation at a temperature of -50°C. of the motors, of certain auxiliary apparatus and compressors, and various Silentbloc elements.

Running Tests

Some running tests were undertaken on the Lorraine electrified lines of the S.N.C.F., with a U.S.S.R. locomotive fitted with two of the Chinese bogies.

With a goods train of 2,270 tonnes trailing weight a standing start was made on a 1 in 83 gradient, and the load accelerated up to 37 m.p.h. on notch 31, the tractive effort going up to 29.5 tonnes (65,000 lb.) and the d.b.h.p. to 6,200, each traction motor taking 1,200 amp. at 725 V. During the tests d.b.h.p. values of 5,000 to 6,500 at 36-38 m.p.h. were recorded with corresponding drawbar pulls in the neighbourhood of 30 tonnes (66,000 lb.).

Return Currents and Axleboxes

The effects of electric traction on different bearings and some possibilities of protection

IN recent years the spread of electrification has brought in several instances a trouble not known on railways operated entirely by steam or diesel traction, and that is the damaging effect of return electric currents on axleboxes. Some attention was drawn to this in the *Bulletin de l'Association Internationale du Congrès des Chemins de Fer (La Traction Electrique)* for July and August, 1958 (French edition), and September, 1958 (English edition). These articles referred particularly to the effects on roller bearings; but experience on the French

through the various types of axleboxes from the axles to the rails, one may consider roller-bearing and plain-bearing types schematically, as in Fig. 2. In both cases the body of the box is earthed to the vehicle and the axle is at rail potential through the tyre. The current consequently runs from the box to the journal through the interior of the box. Where the contacts are satisfactory the critical points will be the contacts between races and rollers in the roller-bearing box and the bearing-journal contact in the plain-bearing box.

surfaces are greater, but the current, though perhaps better distributed, has to run through an insulant, the oil, of which the resistance is in proportion to the thickness of the layer.

Resistance of Axlebox

Thus both general types of axleboxes set up an electrical resistance, and one that is more than negligible. As regards the passage of current through the insulating medium, two main factors are involved: the amperage of the current and the distance between the two electrodes. But it is probable also that the relative speed of the rotating component to the stationary part has an effect, particularly where the insulating medium is thick and the return current has to traverse a circular whirling barrier of lubricant. In any case, two distinct actions can be noted: (a) passage of the current by sparking effect, the spark being cold and of a bright blue tinge; the electrostatic forces brought into play lead to a tearing away of material in the direction of the flow of current; (b) current passes in an arc with temperatures as high as 3,000 to 4,000° C., and here the surface is attacked to the extent of small craters being formed. Micrographic examination of these craters shows a martensitic cavity, transition structure areas between the martensitic part and the base material, and splashing due to the secondary arc paths.

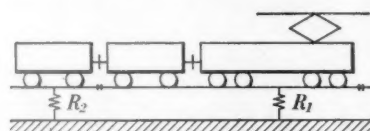


Fig. 1—Return current paths

National Railways, where forced-lubricated plain-bearing axleboxes are used on every electric locomotive built since the war, has indicated no trouble at all, despite the extent and the intensity of the electrified services in France.

With increase in electrification have come not only more frequent services, but also higher horsepowers per axle and so higher return currents per axlebox, without any comparative increase in the size of the axle journals and wheel seats, and this has tended to intensify the return currents and any problems they raise. At first sight one might expect only the motored axles of locomotives and multiple-unit trains to suffer; but the problem at once became more disconcerting and of substantially greater overall importance when it was discovered that the bearings of wagons hauled by electric locomotives were being damaged by arcing effects from return currents, sometimes even spectacularly. That this return-current problem has surprising manifestations has been indicated by observation of arcing between wagon buffers at the moment of starting a heavy train out of a marshalling yard.

Return-current Problem

The return-current problem may first be considered in an elementary way by taking an electric locomotive and train with, say, the locomotive and first wagon on the same length of rail earthed through a not negligible resistance R_1 as shown in Fig. 1. If the resistance of the adjacent rail is lower, then the greater part of the current will run via the second wagon located on this next rail. Actual observation has shown that only rarely do passenger-carriage axles suffer, and probably this is due to the greater electrical continuity of main lines compared with those in even large yards and in sidings.

Regarding the passage of current

Electrical Contact in Axleboxes

If one considers, in a roller-bearing box, one roller stopped in such a way that the vertical load is applied through the axis of the roller, then the Hertzian formula enables one to appreciate the value of the contact surface S_1 relative to the load. Distribution of the load over the bearing requires S_1 to decrease symmetrically at both ends of the vertical axis. The electrical contacts at surfaces S_1, S_2, S_3 , and so on, are not perfect, as there is a layer of grease between the rollers and the races.

Under these conditions the return current must pass through this layer of insulation and follow a path through surfaces S_1, S_2, S_3 , and so on, the area of which is relatively small, and is related to the vertical load. With the plain-bearing type of box the contact

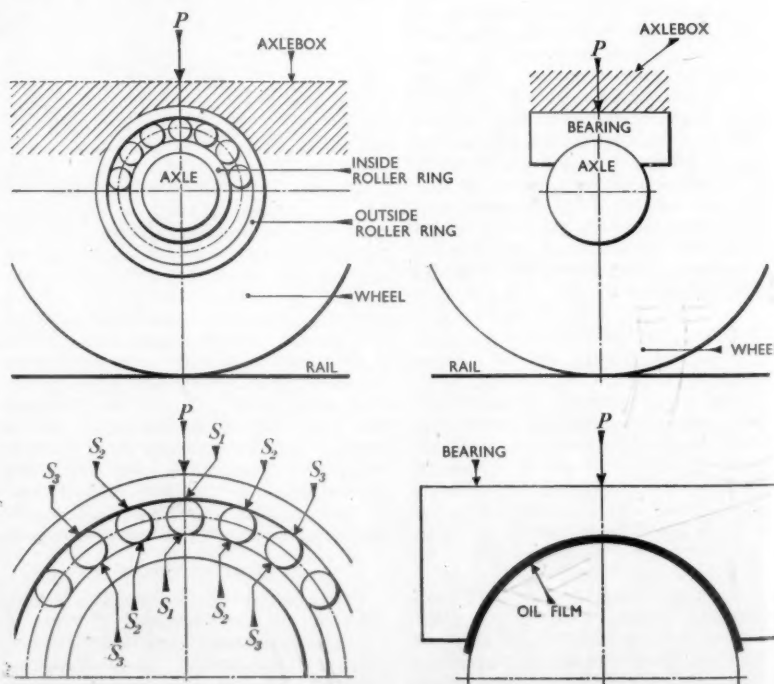


Fig. 2—Return current conditions through roller-bearing axlebox, left, and plain axlebox, right

Though no substantial trouble had been experienced in France due to return-current action on axles and boxes, there was some scepticism about damage hazards from this cause, and as part of an investigation into this and the reported troubles from other railways, some tests with different kinds of axleboxes were made at the Isothermos laboratory in Paris in which S.N.C.F. engineers took part. The tests were conducted on a grease-lubricated roller bearing, standard oil-pad plain bearing, and an Athermos axlebox with pressure lubrication, and were directed particularly to establishing the electrical resistances of the different types.

Under a return current of 40 A. d.c., the oil-pad box showed an electrical resistance which increased slightly with the speed but decreased with an increase in load; the roller-bearing box showed an electrical resistance definitely lower than that of the plain-bearing boxes, but was very sensitive to changes in load; the Athermos box had a somewhat higher electrical resistance than the oil-pad box. The ohmic resistances measured in these three types under different vertical loads are given in Table I.

With the oil-pad type of plain-bearing axlebox the electrical resistance is lower because the oil layer is thin; also, the bearing surface, though proportionately large, is but little affected by changes in

TABLE I. OHMIC RESISTANCE THROUGH AXLEBOXES

Vertical load, tons	Ordinary plain box	Athermos box	Roller-bearing box
10	1.82×10^{-3}	2.18×10^{-3}	0.29×10^{-3}
5	1.91×10^{-3}	2.32×10^{-3}	0.48×10^{-3}
2.5	2.32×10^{-3}	2.45×10^{-3}	0.56×10^{-3}

vertical load. In the Athermos box the oil layer resulting from the forced lubrication offers a higher and more stable electrical resistance. Indeed, from the aspect of electrical stability the hydrodynamic lubrication of this box brings a damping effect almost akin to that of mechanical damping means, and this is of importance, for in motive power and rolling stock there are several sources of vibration giving rise to changes in vertical loading. Consequently electrical shunting of the axlebox can be easier; and the shunt itself is more efficient and constant when the electrical resistance of the axlebox is higher and more constant. With the roller-bearing box the contact was more akin to metallic, and so this box offers low electrical resistance which varies with the contact area, that is, with the pressure of application. The measurements made showed that the electrical resistance of the roller-bearing varied as the square of the unit load. Certain other tests undertaken in Germany have shown that the electrical resistance of roller-bearing boxes also varies in proportion to the amperage of the return current flowing through.

Damage to Axles and Axleboxes

Damage to axles and boxes is in two forms, lining up with the two distinct actions of electric current noted earlier. There is, first, a deposit of material from the anode to the cathode (here the journal), which is slowly covered with a

rough layer of metal. Secondly there is the formation of craters, often quite large, with secondary craters extending round the main one, showing the points of impact, or splashing, of secondary arcs. Both phenomena are found with plain-bearing axleboxes. With roller-bearing boxes the manifestations are of a different type, in that undulations, or "streaks," appear on the races, particularly the inner race, which becomes the cathode, and also appear by a reflex action on the rollers.

Effects of Current Intensity

One German investigator, Shenk, dealing with the effects of current intensity, has determined a form of amperage threshold, beyond which physical damage begins, and the values he obtained are given in Table 2. He considered that current values below 1.4 A. per sq. mm.

TABLE 2. AMPERAGE THRESHOLD, ROLLER-BEARING AXLEBOXES

2 A. per sq. m.m.	After 5 hr. operation
1.8 A. " "	25 hr. "
1.7 A. " "	50 hr. "
1.4 A. " "	500 hr. "
below 1.4 A. " "	No damaging action

depositing metal and partly from the vibrations to which the bearing is subject in common with all axleboxes, such as those arising from rail joints, tyre irregularities, and the suspension system. That is, the bearings are subject to fretting corrosion supplemented by the action of return electric currents.

The only real protection which can be given an axlebox assembly against return currents is to keep them away from those currents altogether. This can be done in principle by providing electrical insulation for the axlebox and by-passing the current through a specially devised circuit, or by shunting the axlebox through a shunt offering a very low resistance compared with the resistance of the axlebox. In motive power, whether in the form of locomotives or motor-coaches, the available circuits can be given close consideration in the design stage, for in certain cases the arrangement for driving the axle may come in a derivation of the circuit.

There have been applications of the insulation method, in which the box has been insulated from the rest of the locomotive mechanical portion by compon-

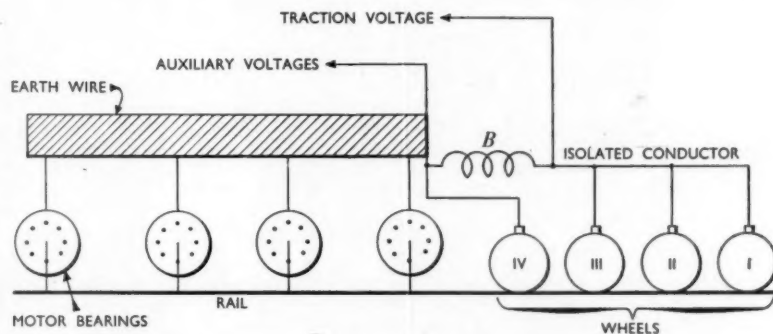


Fig. 3—Earthing of single-phase Bo-Bo electric locomotive

had no deleterious action, and that damage due to current was independent of its nature and frequency.

The two writers, Weytens and van der Vurst, in the *International Railway Congress Bulletin* already mentioned, found that these undulations are due to a deposit of metal which takes place in the direction of the flow of the current. This layer is deposited on the inner race, and the cyclic loading due to the passing of the rollers from the maximum load to that of zero load, crushes it in a constant manner and at distances equal to the spacing of the rollers. This is the beginning of the undulations. This damage increases, and the defects rapidly become accentuated through the mechanical action of the rollers located on a track which has been damaged by the initial attack. Affected areas appear more rapidly as the pressure on the bearing decreases because the area of passage diminishes and so the current density increases; further, the resistance of the dielectric increases with a reduction in pressure.

It seems to be certain that damage to roller bearings is not wholly electrical, but results partly from the flow of current

ents of synthetic rubber and other insulating materials; but growing presence of metallic particles like brake-shoe dust has meant that after a time the protection was no longer thorough, because of shunting through bridges of metal more or less glued by oily or greasy waste. One trial method was to position a layer of polyamid insulation no more than 0.2 to 0.3 mm. thick between the axlebox and the other race of the roller bearing; but this is a rather delicate matter requiring a machining operation after the insulating layer has been sprayed on.

If anything, the second method, of shunting the axlebox by a direct conductor, has been more widely applied; but it needs a rotary contact for a considerable relative displacement has to be met. A spring-loaded device capable of following up the movements has to be provided, along with a contact resistance negligible compared with the resistance of the axlebox.

Earthing of Electric Locomotives

As an example of the earthing of electric locomotives with roller-bearing axleboxes the well-known German E.10-class Bo-Bo single-phase locomotives

may be examined. Here the earthing is done as shown in Fig. 3. The main supply is earthed solely through the direct contacts on axles I, II and III. Only the auxiliary voltages are earthed to the locomotive, which is connected to the rail through axle IV. Between the two there is a protection device B of definite characteristic. On some E.10 locomotives the axles are earthed by the Brown Boveri device, which is a steel disc positioned on the inner side of the wheel, and with which a carbon-bronze brush makes contact. The brush is inclined 5 deg. to the surface of the disc, and contact pressure is 250 to 300 gr. per sq. cm., and average rubbing speed at the top allowable track speed of 130 km.p.h. (81 m.p.h.) is about 11 metres per sec. On other E.10 locomotives the Frost type of earthing is applied; in this there is a contact on the end of the axle, under the front cover. Protection in these German locomotives is provided by an insulated brush and an electrical connection between the brush and the traction current. The brush is of graphite, and a receptacle is fitted for collecting the dust due to abrasive wear; the two compartments of this receptacle also form a barrier preventing the bearing grease from reaching the shunt device. Measurements made with these shunt devices with 16.6-cycle single-phase current of 25 to 125 A. showed that the resistance of the two devices varied between 6 milli-ohms at 25 A. and 2 milli-ohms at 125 A. Joint investigations of the German Federal Railway and the K ugelfischer

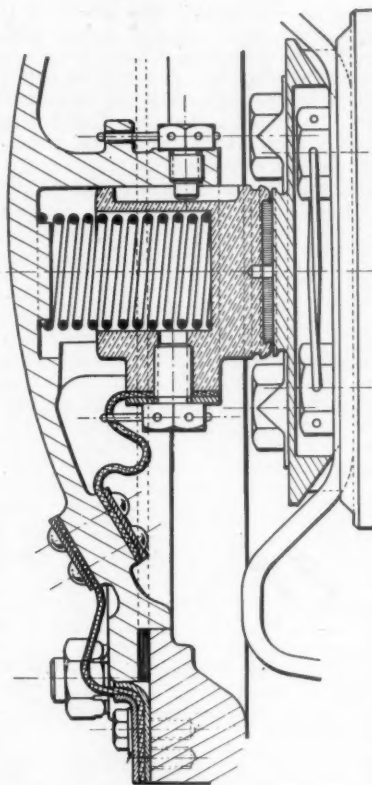


Fig. 4—Shunt on an Athermos axlebox on the S.N.C.F.

works indicated that the resistance of the roller-bearing axlebox was 25 milli-ohms at 25 A. and 5 milli-ohms at 125 A., but whether the shunt of 2 milli-ohms was sufficient protection for the box contact of 5 milli-ohms was not stated.

Earthing Through Plain-bearing Boxes

Earthing of locomotives with plain-bearing boxes requires a different approach, in that the electrical resistance is higher and that the box is less sensitive in its electrical resistance to changes in superimposed vertical loading. The Athermos axleboxes used so successfully on all French electric locomotives, d.c. or a.c., have a shunt comprising a plunger bearing against a piece attached to the end of the journal. The bronze plunger is connected electrically by copper strip to the front cover of the axlebox, as shown in Fig. 4, and is kept up against a journal end by a helical spring. The end rubbing surface of the plunger is given a 5-mm. coating of whitemetal, and spring pressure is about 9 kg. (20 lb.). Relative displacements of axle and axlebox are taken up by the travel between the plunger, or piston, and its guide, or cylinder, in the axlebox cover. The thousands of axleboxes protected by this means, including those on the two 331 km.p.h. (206 m.p.h.) record-breakers, some of them in service now for 10 years, have been fully protected, and no trace of arcing or metal deposition have been found. Wear of the plunger and its barrel have been slight, and the plunger can be relined with whitemetal.

A.C. Electric Traction in Glasgow Suburban Area



Three-car train built by Pressed Steel Co. Ltd. (see page 517 of last week's issue)

RAILWAY NEWS SECTION

PERSONAL

Mr. S. N. Wadhwa, formerly Chief Engineer, Eastern Railway of India, has taken over as Chief Engineer South Eastern Railway.

Mr. K. B. Mathur, M.Sc., Chairman, Indian Railway Board, has been appointed Chairman, Heavy Electric Products, Ministry of Commerce. Mr. Mathur was born in 1904, and was educated at Kanpur and Muir

duties as Chief Operating Superintendent in November, 1951. He was appointed General Manager, Bengal Nagpur Railway in January, 1952, and of the Eastern Railway of India later the same year. He became a Member of the Indian Railway Board in 1954, becoming Chairman in 1959. He was a delegate to the International Railway Congress, Lucerne, in 1947. In 1956 he visited Washington in connection with a loan for India, with particular reference to the Indian Railway Modernisation Plan.

Mr. D. C. Taylor, Assistant Dock Superintendent, King George Dock, Hull, British Transport Docks, has retired. Mr. Taylor joined the former North Eastern Railway in 1914. He was appointed Assistant Dock Agent, Hull, in 1947, a position re-designated Assistant Dock Superintendent in 1958.

Mr. Karnail Singh, M.I.C.E., Member (Engineering), Indian Railway Board, has been appointed Chairman of the Board. Mr. Singh was born in July, 1904, and gradu-



Mr. K. B. Mathur

Chairman of the Indian Railway Board, 1959-60



Mr. Karnail Singh

Appointed Chairman of the Indian Railway Board

Central College, Allahabad. He graduated as M.Sc. and worked as a Professor of Physics at Ewing Christian College, Allahabad. He joined the East Indian Railway, in 1928, as Probationary Assistant Transportation Superintendent. He later served as a senior scale officer, in various capacities in the Commercial and Transportation Departments. In 1922 he was loaned to the Defence Department, and took charge of all rail movements in the Eastern Army zone. On release from the Defence Department he returned to the East Indian Railway, as Superintendent Transportation, Howrah. After a period as Superintendent Transportation, Asansol, he was promoted to be Divisional Superintendent (Transportation), Dhanbad. In 1947 he became Deputy Chief Commercial Manager (Goods), at headquarters, and, later that year took over as Divisional Superintendent, Allahabad. In 1948 he became Chief Operating Superintendent, E.I.R. In March, 1951, he officiated as General Manager in the absence of Mr. B. B. Varma. Mr. Mathur resumed

Mr. W. Urquhart, Deputy General Manager, East African Railways & Harbours has retired after 34 years' service.

We regret to record the death on May 1, at the age of 75, of Lord Glyn of Farnborough, a Director of the London Midland & Scottish Railway from 1929 until nationalisation. He was for some years a member of the Scottish Committee of the L.M.S.R. He was also a Director of Samuel White & Co. Ltd.

Dr. T. O. Elias, Nigerian Research Fellow & Lecturer at the Commonwealth Studies Institute at Oxford, has been appointed Chairman of the Commission to inquire into the affairs of the Nigerian Railway Corporation. Other members are Sir Arthur Kirby, London Commissioner for East Africa, and Dr. Pius Okigbo, Economic Adviser to the Eastern Nigerian Government. Reference to the Commission of Inquiry was made in our March 11 issue. Work will begin on May 17.

ated from the Thomason Engineering College, Roorkee. He joined the Indian Railway Service of Engineers on the North Western Railway in 1927. Mr. Singh later played an important part in the construction of the Hindubagh-Fort Sandeman Extension of the Zhob Valley Railway. Towards the end of the 1939-45 war, he became Deputy General Manager, Rehabilitation & Development, later taking charge of the surveys in the North Western Frontier Provinces and the Punjab. After Partition, he was appointed Transfer Officer with headquarters at Lahore. In 1947 he was appointed Engineer-in-Chief Assam Rail Link Project. After a short period as Senior Deputy General Manager, Central Railway, he became the first General Manager, Northern Railway, in 1952. He was made General Manager, Chittaranjan Locomotive Works, in 1954, and was appointed Member (Engineering), Indian Railway Board in 1957. Later that year, with other Indian railway officers, he visited the United Kingdom and the Continent to study a.c. electrification.



Mr. A. E. Purnell

Appointed District Operating Superintendent, Wakefield, N.E. Region



Mr. J. R. Legg

Appointed District Operating Superintendent, Glasgow South, Scottish Region



Mr. I. G. Carson

Appointed Assistant to the General Manager (Works), Western Region

Mr. A. E. Purnell, Assistant District Operating Superintendent, Newcastle, North Eastern Region, British Railways, who, as recorded in our April 22 issue, has been appointed District Operating Superintendent, Wakefield, joined the former North Eastern Railway in 1921 as a clerk at Carlton. He served at a number of stations and later became a Traffic Apprentice. He was appointed Assistant Yardmaster, Blyth, in 1933, and subsequently held appointments as Stationmaster, Kirkby Stephen; Yardmaster, Haverton Hill and Port Clarence; Chief Trains Clerk and Chief Controller, District Operating Superintendent's Office, York; and Stationmaster, Bridlington. In 1943 he became Assistant District Operating Superintendent, Leeds and in 1944 was appointed Assistant District Operating Superintendent, Norwich. In 1948 he was appointed General Assistant to the Commercial Superintendent, Liverpool Street, and in 1951 became Assistant District Operating Superintendent, Newcastle.

Mr. J. R. Legg, Freight Trains Assistant to the Chief Operating Superintendent, Scottish Region, British Railways, who, as recorded in our February 26 issue, has been appointed District Operating Superintendent, Glasgow South, joined the London & North Eastern Railway as a probationary clerk at Bedlington in 1934. In 1939 he began training as a Traffic Apprentice at Lenzie, near Glasgow. He served with the Forces from 1939 to 1946 and attained the rank of Major. On returning to the L.N.E.R. he was appointed to the Superintendent's Office, Edinburgh, and in 1949 he became Assistant to the District Operating Superintendent, Darlington. In 1951 Mr. Legg returned to Scotland as Assistant District Traffic Superintendent, Aberdeen, and in 1955 was appointed Assistant District Operating Superintendent, Glasgow South. The following year he became Freight Trains Assistant to the Chief Operating Superintendent, Scottish Region, the position which he has now vacated.

Mr. I. G. Carson, Assistant, General Manager's Office, Western Region, British Railways who, as recorded in our April 15 issue, has been appointed Assistant to the General Manager (Works), was educated at Sherborne School and joined Great Western Railway in the General Manager's Office, in 1925. After experience in the General and Works Sections of that Office, he rejoined the Works Section in 1937 of which he became Head in April, 1948. In February, 1957, he was re-classified Assistant, General Manager's Office, and during the past few years has been concerned mainly with major works schemes being carried out under the modernisation plan.

Mr. A. W. Geuer, A.A.S.A., Assistant Comptroller of Accounts, Victorian Railways, who, as recorded in our April 22 issue, has been appointed Comptroller of Accounts, joined the Victorian Railways as a supernumerary junior clerk in 1914. Mr. Geuer was appointed to the permanent staff in



Mr. A. W. Geuer

Appointed Comptroller of Accounts, Victorian Railways



Mr. J. A. Wright

Appointed General Solicitor, Canadian Pacific Railway



Mr. W. G. Dadswell

Appointed District Freight & City Passenger Agent, London, C.N.R.

March, 1918. He enlisted shortly afterwards and served in the Forces until rejoining the Department in September, 1919. Six years later took an active part in the introduction of District Accounting. Mr. Geuer became Assistant Inspector in 1934, and was appointed Internal Auditor a year later. Between 1941 and 1946 he was on loan to the Defence Department as Accountant in charge of the Overseas Recovery Section, responsible for the collection of £250 million from overseas countries. On resuming with the Victorian Railways he was appointed Statistical Officer in charge of the Power Machines Division. Later he was Chairman of a committee planning the replacement of power machines. While on a nine-month private overseas trip in 1956, Mr. Geuer carried out an important assignment for the Auditor-General and, at the request of the Commissioners, investigated modern power machines practices. At the time of his appointment, Mr. Geuer was Assistant Comptroller of Accounts, a position he had held since March last year.

Mr. J. A. Wright, Assistant General Solicitor (East), Montreal, Canadian Pacific Railway, who, as recorded in our February 12 issue, has been appointed General Solicitor, was a graduate of the University of Toronto and Osgoode Hall. He practised law privately in Toronto for six years before joining the Canadian Pacific Railway Law Department, Montreal, in 1937. He was appointed Assistant Solicitor, Vancouver in 1940, becoming Solicitor there in 1946. He moved to Toronto, as Solicitor, in 1954, and on January 1, 1959, became Assistant General Solicitor (East).

Mr. W. G. Dadswell, Chief Clerk to the European Freight Manager, Canadian National Railways who, as recorded in our April 15 issue, has been appointed District Freight & City Passenger Agent, London, will be located in the C.N.R. City Office. He will be responsible for the development of freight traffic throughout the Southern half of England and Wales, and for passenger business within the City of London. Mr. Dadswell began his railway career in 1922 in the Accounts Department, C.N.R. Financial House in London. After holding various positions in accounting he was transferred, after the 1939-45 war, to the London City Traffic Office as Chief Clerk, becoming Freight Traffic Representative five years later. In 1955 he was appointed Chief Clerk to the General Freight Agent, European Headquarters, London. He subsequently became Chief Clerk to the European Freight Manager.

Mr. J. F. Clark, Chairman of the Executive Committee and President of ACF Industries Incorporated, is visiting Britain and European capitals for meetings with licensees and manufacturers of the company's products. He is accompanied by Mr. Henry Correa, Vice-President of Marketing ACF Limited.

INSTITUTION OF CIVIL ENGINEERS AWARDS
The Institution of Civil Engineers announces the following Awards for 1959:—
The Telford Gold Medal

Mr. H. Ridehalgh, for his paper, "Shoreham Harbour development."

James Watt Medal

Mr. R. E. Sadler, for his paper "Development in overhead electrification of railways as it affects the civil engineer."

Howard Gold Medal

Mr. R. H. Wood, for his paper "The stability of tall buildings."

George Stephenson Medal

Sir Ralf Emerson, for his paper, "A project for extending the Nigerian Railway into Bornu Province."

We regret to record the death on April 30, at the age of 70, of Sir George Legh-Jones, Managing Director, Shell Transport & Trading Co. Ltd.

We regret to record the death in Buenos Aires on May 2, at the age of 77, of Mr. H. F. Bauer, formerly Engineer-in-Chief, Buenos Ayres & Pacific Railway.

Mr. F. J. Erroll, Minister of State, Board of Trade, accompanied by his Private Secretary, Mr. R. Goldsmith, is making an official visit to Iraq and Iran, April 30 – May 15. He will be spending a week in each country.

Mr. M. R. Reddy, Officiating Deputy Chief Engineer, South Eastern Railway of India, has been appointed Officiating Joint Director, Civil Engineering, Indian Railway Board.

Mr. Pierre Delagrave has been appointed Special Assistant responsible for departmental organisation, Canadian National Railways. Mr. R. R. Latimer becomes Traffic Research Officer. Mr. Delagrave was formerly Special Assistant to the Vice-President & Secretary. Mr. Latimer was Assistant Traffic Research Officer, and was born at Florence, Ontario.

Mr. G. J. W. Turner, Chairman of Wright's Ropes Limited, has joined the board of the Lancashire Steel Corporation.

Mr. C. Cavill and Mr. G. W. Hollingsworth have been elected Directors of Neepsend Steel & Tool Corporation Limited.

Mr. Russell Cooper has retired from the board of Docker Brothers. Mr. Stephen Cooper has been appointed Sales Manager, Railway Division.

Mr. F. H. Shepherd has been appointed Manager, Spanish, Portuguese & South American Export Sales Zone, Perkins Engines Limited.

Mr. C. E. Perry, Chief Design Engineer, Evershed & Vignoles Limited, has retired after 48 years continuous service with the company.

Mr. N. R. D. Gurney has relinquished the position of Manager, Heavy Plant Division Large Electrical Machine Sales, Manchester, Associated Electrical Industries Limited, but will remain a member of the Executive of Heavy Plant Division. Mr. I. A. Ferguson, Manager, Large Electrical Machine Sales, Rugby, assumes responsibility for the entire department and Mr. J. Cannell is appointed Assistant Manager.

L.M.R. APPOINTMENTS

London Midland Region, British Railways, announces the following appointments:—

Mr. A. C. Brincombe as Assistant Electrification Project Officer, General Manager's Office, Euston.

Mr. C. W. Edwards as Permanent Way Assistant (Electrification), Chief Civil Engineer's Department, Euston.

Mr. W. O. Parish as Assistant (Modernisation), Operating Department, Euston (located at Rugby).

Mr. N. J. Cooper as Assistant District Goods Manager (Sales), Birmingham.

Mr. L. P. Lewis as Traffic Costing Officer, Divisional Traffic Manager's Office, Birmingham.

Mr. J. G. Spencer as Assistant District Motive Superintendent, Carlisle (located at Barrow).

Mr. E. O. Roberts as Goods Agent, Northampton (Castle).

Mr. R. J. Croucher as Goods Agent, St. Pancras, Somers Town.

Sir John Elliot, Chairman, Thos. Cook & Son Ltd., has been elected to the board of the International Sleeping Car Company.

Mr. P. J. Hannaberry, Commissioner, Commonwealth Government Railways, Australia, has resigned. Mr. K. A. Smith, Chief Mechanical Engineer, has been appointed Acting Commissioner.

Professor O. A. Saunders, Head of the Department of Mechanical Engineering, City & Guilds College, has been elected President of the Institution of Mechanical Engineers for the ensuing year. Dr. C. G. Williams, Director & General Manager, Shell Research Limited, has been elected a Vice-President.

Mr. C. F. Watts, Financial Controller, Wickman Limited, has been appointed a Director of the company.

Mr. W. R. Timken has been elected President of the Timken Roller Bearing Co. Ltd., in succession to Mr. Dwight A. Bessmer who has resigned because of ill-health.

Sir John Evetts, having relinquished his Directorship of Rotol Limited, has been appointed to the board of Dowty Fuel Systems Limited. Both are subsidiaries of the Dowty Group.

Mr. M. H. Beattie, formerly London Sales Manager, Scottish Cables Limited, has been appointed Assistant Sales Manager (Power Cables) British Insulated Callender's Cables Limited.

Sir Willis Jackson, President of the Institution of Electrical Engineers, and Mr. W. K. Brasher, Secretary of the Institution, were sponsored by the British Council to hold discussions in Poland last month on the training of electrical engineers.

Mr. Leonard G. Oxford, Managing Director of Simmonds Aerocessories Limited, and of Firth Cleveland Instruments Limited, members of the Firth Cleveland group, has been elected President of the South Wales branch of the National Union of Manufacturers.

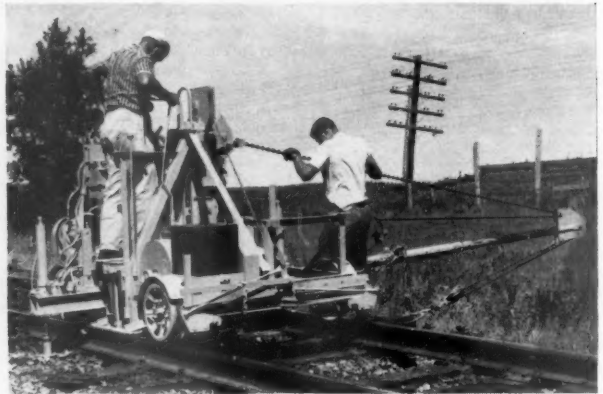
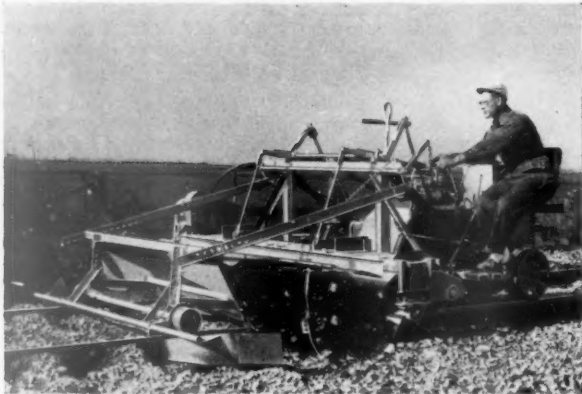
Mr. D. M. Boyd, who has been a Director of Fisons Limited, for the past 18 years, has retired from the board. He will be remaining with the company for a further year to complete his work with the Association of Chemical & Allied Employers of which he is Chairman.

53RD CREWE DINNER

The following is a list of members and of guests who accepted invitations to attend the 53rd Crewe Dinner (see editorial note page 526):—

Messrs. L. I. R. Abbott, B. Adams, J. Alcock, Major C. F. Ashdown, Messrs. P. Baker, J. Bardsley, D. H. Binyon, R. C. Bond, G. F. Brassington, W. B. Broadbent, Ellis R. Brown, O. V. S. Bulleid, K. Cantlie, C. A. Comyns Carr, G. O. B. Clarke, J. G. Clements, G. Collingwood, K. J. Cook, B. W. C. Cooke, V. R. Bowen Cooke, D. R. Coupe, M. Croft, G. R. Curry, D. C. Davies, R. F. W. Eardley, J. Fore, A. S. Gillitt, H. J. Grant, K. F. Grant, R. J. Hadfield, J. F. Harrison, G. T. Hart, F. J. Hookham, I. Johnson, Prof. J. M. Kay, Mr. D. Kidd, Brig. C. A. Langley, Messrs. G. A. Lemon, R. C. S. Low, A. J. Marsden, W. E. K. Mayne, J. P. Metcalfe, R. Metcalfe, T. A. O'Neill, J. Parke, G. Parr, R. A. Riddles, S. Ridgway, F. B. Roberts, A. E. Robson, C. R. H. Simpson, J. O. Sims, R. A. Smeddle, Sir William Stanier, Sir Reginald Terrell, Messrs. R. Thompson, G. R. Thomson, W. G. F. Thorley, J. F. B. Vidal, W. E. Yates, and J. R. Yates.

NEW EQUIPMENT AND PROCESSES



Permanent Way Machines

FOUR new machines for work on the permanent way are a new track-sweeper; an improved combination sleeper-puller, sleeper-insertor, and material-handling crane; a self-propelled ballast-remover, and an improved tamping power jack.

Trak-Sweeper

The Trak-Sweeper (above left) levels ballast in the track and across the crib area for better ballast distribution ahead of the tamper and removes excess ballast from the top of sleepers after tamping.

Hydraulically - propelled, the machine works at approximately 10 ft. per min. and travels up to 15 m.p.h. Extensive use of aluminium contributes to a light weight which does not disturb the surface of the track when operating between the jacking means and the tamper.

Four radially-mounted heavy-rubber blades on a rotating impeller at the front of the machine are shaped to clean the rail base and are adjustable to allow for wear. The impeller is hydraulically raised and lowered for travelling or varying ballast conditions. Two impeller speeds permit slow speed before tamping and high for removing ballast afterward. At slow speed, the paddles distribute the ballast over the full length of the sleeper. At high speed, the rapidly-rotating paddles throw the excess ballast ahead and against a baffle attachment.

The baffle is mounted on its own wheels at the front of the sweeper for better dis-

tribution of weight and to allow independent adjustment of baffle and impeller for varying rail height. When clearing trains, the baffle can be manually removed from the track as a separate piece.

Gandy-Snapper

The Gandy-Snapper (above right) is an improved version of the manufacturer's combined sleeper-puller, sleeper-insertor, and materials-handling crane. A new snapper feature lifts the rail clear of the "high wood" when extracting sleepers, and a larger engine and hydraulic pump have been fitted. This machine is offered in addition to the standard Gandy, supplies of which are not affected by the development of the new product. Also on offer is the Snapper—a separate, lightweight machine for one-man operation during removal or insertion of sleeper plates in sleeper renewals.

During sleeper removal, the snapper element is positioned over a sleeper adjacent to the one to be pulled. Rail grips are lowered while two hydraulic rams push down on the adjacent sleeper. This causes the rail to be lifted to clear the "high wood" of the sleeper being extracted.

After one sleeper has been extracted, the operator can "snap off" the rams for a sharp return action of the rail which minimises any tendency to hump the track.

Cribex

The Cribex, illustrated below (left), is a self-propelled machine for removing ballast from between sleepers or switch timbers, for cribbing in connection with complete

ballast cleaning or when lowering track.

Its completely hydraulic self-propulsion unit moves the machine from crib to crib and permits the operator to "rock" it back and forth to excavate wide cribs. No helper is required.

The new, self-propulsion feature is available on all new Cribex machines. It is also available as a kit for ready installation on machines now in the field.

Tamping Power Jack

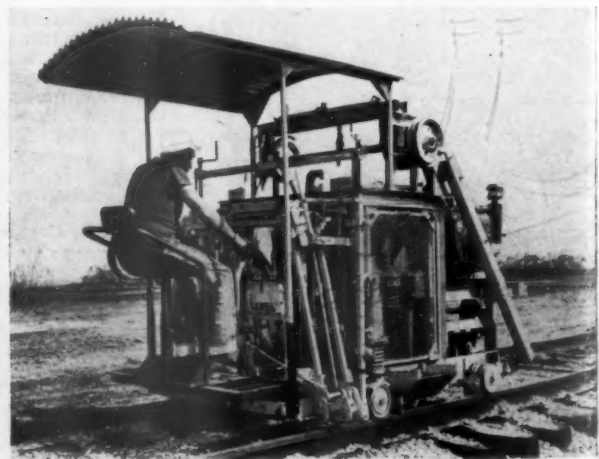
The new Model "D2" tamping power jack, illustrated below (right), is hydraulically-propelled. Hydraulic power is also used to raise the head, operate the jacking rams, actuate the rail clamps, and operate the set-off devices.

With an automatic two-speed feature on the lifting rams, the track-raising time at each stand is measurably reduced. Movement of the rams downward until tamping begins and during retraction is carried out at high speed. Tamping speed is reduced for efficient control of track-raising.

A simple hydraulic arrangement automatically lowers or retracts the rail clamps as the lift rams are lowered or raised. The lamps are adjustable to suit varying rail heights.

An adjustable seat and a canopy are provided for the operator. Other improvements include higher horsepower, a pivoted sheave arrangement, improved plastic insulated wheels, and larger-capacity fuel tank.

Further details of all these machines can be obtained from the Nordberg Manufacturing Company, Milwaukee, Wisconsin, U.S.A.





Bush Removal Kit

THE Apkaway 291 kit gives maintenance fitters an efficient means of removing worn bushes and inserting new ones in machinery such as small electric motors and vehicle suspension units. It can also simplify the removal of transmission axle bearings and similar heavy work if the drifts are used as adaptor plugs in conjunction with a standard hydraulic ram (Apkaway No. 40 size), and various pullers available separately.

The kit is designed for dealing with bushes of $\frac{1}{2}$ -1 $\frac{1}{2}$ in. outside and $\frac{3}{16}$ -1 $\frac{1}{2}$ in. inside dia. It is manufactured from high-quality materials for hard wear and frequent usage. There are included two drift holders and 14 double-ended drifts graduated in size to cover British Standard bushes of various diameters and wall thicknesses. The retail price, complete with polished wood case, is £4 10s.

Further details may be obtained from J. W. Pickavant & Co. Ltd., Apkaway Works, Bow Street, Birmingham, 1.

New Vending Machines

FIVE new vending machines are available for the catering industry. They are a cold buffet machine, a candy machine, a pastry machine, a console cigarette vendor, and a hot food vending machine.

The cold buffet machine contains up to 400 sandwiches in ten columns of drop shelves. Each column can accommodate up to 40 sandwiches or a correspondingly lower number of larger items.

Push buttons control each column to provide up to 10 selections. All food items are kept under refrigeration.

The candy machine has 11 columns of varying capacity. Finish is in charcoal black or two other attractive colours. It stands 65 in. high, 35 $\frac{1}{2}$ in. wide, and 12 in. deep and sells at two different prices, the mechanism accepting sixpences or shillings.

There is an eight-column capacity for candy (total 190) and a three-column capacity for gum or mints (total 100-170 according to the products). Price is £186.

The pastry machine can handle sandwiches, pastries, and cakes. Standing 65 in. high, 31 in. wide, and 12 in. deep, the machine has a standard capacity of 85 packets with three 15-shelf columns and two 20-shelf columns. Extra 20-shelf columns can be supplied to order to give sixpences or shillings. Colours include charcoal black.

The console cigarette vendor stands 46 in. high, 32 in. wide, and 16 $\frac{1}{2}$ in. deep. Colours include beige. The machine accommodates 20 different brands of cigarettes and a total of 860 packets. Adaptors are available for King-size packets.

The coin mechanism accepts all coins from 6d. to 2s., and can be set to vend at

four different prices simultaneously up to 4s. Price £250.

The hot food vending machine contains 52 pre-prepared meals. It stands 78 in. high, 30 in. deep, and 35 in. wide.

The pre-prepared meals, each in its own foil dish, are stored in the machine, which is refrigerated. At the pre-set time, refrigeration is automatically switched off and heating elements come into operation to bring the food to serving temperature. The meals are delivered automatically through a special opening as coins are inserted in the slot. The warm temperature is maintained during meal-time after which the cabinet automatically reverts to refrigeration.

The machine is loaded from the front and is completely hygienic.

The steel cabinet has a paint-sprayed finish and corrosion-resistant, thermostatically controlled oven. Delivery time is 6 sec. and average heating time for 52 eight oz. meals is 50 min. A signal light indicates when the food is ready for serving. Price is £395.

Further details of all these machines can be obtained from the British Automatic Co. Ltd., 14 Appold Street, London, E.C.2.

Plastic Cable Cleats

TELCLEATS are precision-moulded one-piece black plastic cleats made in 11 sizes for most circular-section cables from $\frac{1}{2}$ -in. up to 2-in. dia. Each has a single hole to give a means of securing to any wall surface or in trays, trunking, or racks.

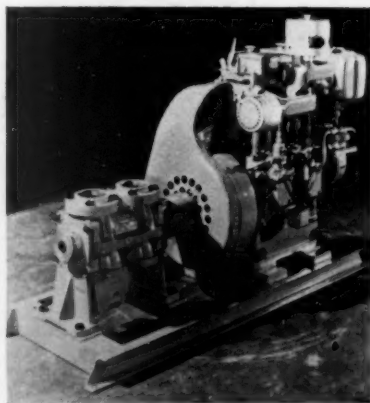
Flexibility of the Telcothene plastic material allows for opening out to enable the cleats to be fitted on the cable; yet a good grip is obtained to minimise slipping in vertical runs. Telcothene tubing for cold water installations may be supported by the same means.

The manufacturer claims that the relatively low price of the cleats will encourage closer spacing without greatly increasing the cost although normal spacing can be followed as with conventional methods of fixing. The design allows for combinations of different sizes to be assembled in tier formation occupying a minimum of space.

Further details may be obtained from the Telegraph Construction & Maintenance Co. Ltd., Telcon Works, Greenwich, London, S.E.10.

Independent Fire Pump Set

A NEW independent fire pump set, approved by the Ministry of Transport and complying with "Safety of Life at Sea" regulations, combines a Goodyear A.12 positive-displacement rubber-to-metal pump and a Petter AVA.2 air-cooled diesel



engine (10 b.h.p.) to form a reliable, compact, efficient and portable set, direct-coupled at the 1,800 r.p.m. engine main shaft speed.

Self-priming, the pump has an output of approximately 23 tons an hr. (5,000 gal.) when operating at this engine speed. It can deliver easily two jets of water of over 60 ft. through $\frac{1}{2}$ -in. nozzles and two 40-ft. jets through $\frac{3}{4}$ -in. nozzles. For all duties the pump can operate with heads up to 150 ft. and with suction lifts of 27 ft.

Pump and engine are mounted on a fabricated channel-steel bedplate and the pump is driven through a centrifugal clutch coupling.

Further details can be obtained from Goodyear Pumps Limited, 44, Brook Street, London, W.1.

Fast Electric Fork Trucks

RAPIDE electric fork trucks manufactured by Lansing Bagnall Limited, are capable of working in exceptionally rugged conditions, outdoors as well as indoors, and with speeds of 12-14 m.p.h., a performance which, it is claimed, has only been achieved previously by engine-powered trucks.

In the past it has been a disadvantage of the electric fork truck that it is too slow for some operations; this has been accepted because of the truck's excellent value for indoor work. The Rapide, which is being made initially with hydraulic lift capacities of 2,000 and 3,000 lb., is claimed to have overcome this disadvantage as it can climb gradients of up to one in five and can be used in extreme climatic conditions even on snow-covered surfaces, while at the same time the design permits its use in 10-ft. aisles in congested factories and the turning radius is only just over 5 ft.

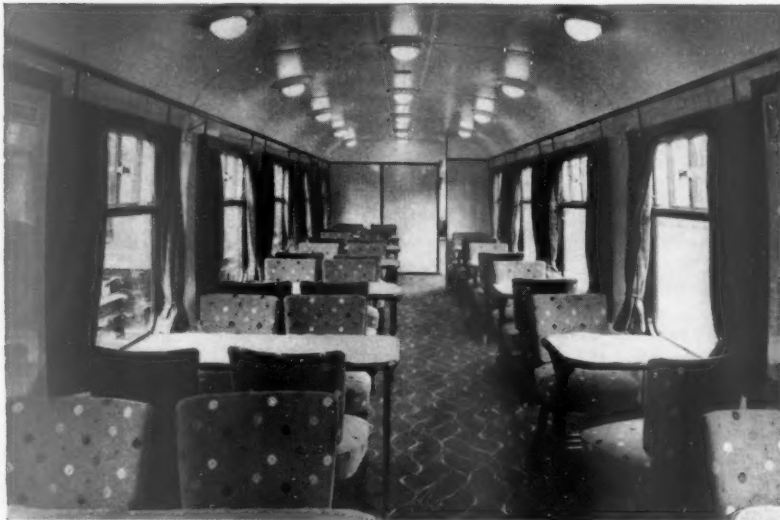
The truck is stated to be exceptionally economical in battery use because, up to 7 m.p.h., the first half of accelerator-pedal travel controls a 24 V. supply; 48 V. supply is used only for the higher speeds. In starting and manoeuvring, too, less energy is used than with an orthodox control circuit. The battery consists of Exide Gauntlet-cells in an all-steel case, capacity 387 A. hr. at the 6-hr. rate. Braking is rheostatic and hydraulic.

Among other special features are the availability of smooth but exceptionally rapid acceleration, a low centre of gravity for greater safety when cornering and braking, and lift speeds of 50 ft. per min. with 2,000 lb. load or 33 ft. per min. with 3,000 lb. The driver's seat is adjustable and comfortably sprung. Inherent advantages common to most electric fork trucks are simplicity and safety of control and freedom from exhaust fumes. A full range of hydraulic attachments is available.

Further details may be obtained from Lansing Bagnall Limited, Kingsclere Road, Basingstoke, Hants.

Institute of Transport Congress in London

Papers on land, sea, and air transport. Visits to transport installations and display of British Railways motive power and rolling stock



Interior of unclassed restaurant car built at Swindon Works, British Railways, and shown at Marylebone Goods Station

The Institute of Transport Congress, 1960, was held in London on April 26-29. The papers were read and discussed at the Waldorf Hotel, W.C.2. An informal reception was held at that hotel on April 26, when Mr. R. G. Grout, President of the Institute, received members and their friends.

Opening by Minister

The Minister of Transport, Mr. Ernest Marples, opened the proceedings on the morning of April 27. In his speech he deplored the high rate of road accidents and the evils of road congestion. He drew attention also to the unsatisfactory state of some American cities, where the demands for parking had resulted in the devotion of a very large amount of space for that particular purpose.

In the meantime, he added, railways in

London and large centres were being used to a large extent only twice a day, for moving people to and from their work. They should adopt a sensible attitude towards the use of the motorcar in cities.

The railways, Mr. Marples added, were essential to the economy of Britain, whatever the losses on their operation might be during the difficult period of modernisation and re-equipment. These losses must continue for the time being, whilst the B.T.C. and British Railways were shaping the system to suit modern needs. He praised the work of the Commission and Railway managements in striving for this end. He re-affirmed his belief that the development of the principle of propulsion embodied in the hovercraft would have far-reaching effects on railways and other forms of land transport. The Minister also pointed out the difficulty experienced by Government departments in

achieving rapid action, because of statutory restrictions.

Restrictions on Transport

Controls and restrictions exercised by the State since the beginning of railways in Britain were the subject of a paper, "The State and Transport Economics," read by Sir Gilmour Jenkins, lately Permanent Secretary, Ministry of Transport. This paper was the subject of editorial comment last week. It took the place of the paper "Some thoughts on the future of inland transport," by Sir Brian Robertson, Chairman of the B.T.C., which originally had been included in the programme.

Rolling Stock Display

On April 27 and 28 a display of British Railways diesel and electric motive power and rolling stock, including wagons for special traffics, and containers, was held at Marylebone Goods Station. Details of the exhibits, some of which were constructed at British Railways works and some by private builders, were given in our April 29 issue.

The exhibition was arranged by British Railways, London Midland Region, in conjunction with the Commission.

In the evening of April 27 a reception was held at Guildhall, in the City. Mr. Grout received the company.

On the morning of April 27 two papers were read: "British shipping—a national service or a commercial enterprise?" by Sir Donald Anderson, Chairman, P. & O. S.N. Co. Ltd., and Past-President, Chamber of Shipping of the United Kingdom, and "British transport aeronautics—looking ahead," by Mr. Peter G. Masefield, Past-President, Institute of Transport, Managing Director of Bristol Aircraft Limited, and President, Royal Aeronautical Society. Reference to Sir Donald Anderson's paper is made in our editorial columns.

Annual Dinner

Mr. R. G. Grout presided at the Institute annual dinner at the Dorchester Hotel, W.1, in the evening. Mr. Ernest Marples was the principal guest.

Proposing the toast of "Her Majesty's Ministers," Mr. Grout reminded his audience that 40 years had elapsed since the foundation of the Institute of Transport, which was commemorating its foundation accordingly, and the formation of a separate Ministry of Transport.

Mr. Marples, replying, referred to the



Buffet counter and (right) kitchen of kitchen/buffet car built for British Railways by Cravens Limited, part of the display at Marylebone Goods Station during the Institute of Transport Congress

appalling loss of life on the roads, and pleaded for greater discrimination in the use of the motorcar. Much railway plant and equipment, he pointed out, was used only in the transport of people twice a day, into and out of their work in large cities.

Others present at the dinner included:

Mr. L. B. Alexander, Sir Donald Anderson, Messrs. G. J. Aston, L. W. Balls, Air Marshal Sir Denis Barnett, Messrs. P. F. Barrett, D. S. M. Barrie, Sir John Benstead, Messrs. J. M. Birch, David Blee, J. Bonham-Carter, H. L. Bowes, Lt.-Colonel P. M. Brooke-Hitching, Mr. A. Bull,

Messrs. F. L. Castle, A. F. R. Carling, Lord Chesham, Messrs. A. J. Clarkson, B. W. C. Cooke, L. W. Cox, F. W. Crews, Sir Gerard d' Erlanger, Messrs. A. R. Dunbar, A. A. M. Durrant,

Colonel Sir Ralf Emerson, Messrs. F. D. Y. Faulkner, K. W. C. Grand, K. Granville, A. G. Griffiths,

Messrs. F. D. M. Harding, J. L. Harrington, L. C. Hawkins, John Hay, S. G. Hearn, F. L. Hick, R. B. Hoff, H. Hogarth,

Mr. L. W. Ibbotson, Sir Gilmour Jenkins, Mr. H. C. Johnson, Lord Kilmarnock, Messrs. C. F. Klapper, D. R. Lamb, Brigadier C. A. Langley,

Mr. W. H. W. Maass, A. B. Macleod, Brig.-General Sir H. Osborne Mance, Messrs. L. E. Marr, Peter Masefield, E. J. Morris,

Messrs. J. R. Naisby, C. I. Orr-Ewing, C. H. S. Pickett, E. Popplewell, G. W. Quick Smith,

Mr. J. Ratter, Lt.-Colonel A. W. Reed, Dr. H. R. Rishworth, Mr. R. M. Robbins, Sir Brian Robertson, Messrs. V. A. M. Robertson, T. W. Royle, Maj.-General G. N. Russell,

Mr. L. M. Sayers, Viscount Simon, Messrs. R. A. Smeddle, D. Stewart, W. A. G. Suddaby, General Sir Cecil Sugden, Maj.-General G. S. Szlumper, Mr. W. J. A. Sykes,

Messrs. A. W. Tait, W. G. Thorpe, A. B. B. Valentine, John Vidal, E. J. Vipond,

Sir Wavell Wakefield, Messrs. S. B. Warder, A. J. Webb, C. E. Whitworth, J. S. Wills, H. Wilmot, Geoffrey Wilson, Sir Reginald Wilson, Mr. G. Yorke.

Technical Visits

Those attending the conference were enabled to visit a wide variety of railway and other transport installations.

Arrangements were made for visits to the following on British Railways and the L.T.E. Underground:

London Midland Region: Carriage cleaning depot at Willesden;

Eastern Region: New electric car sheds at Ilford, Great Eastern Line, with view of Temple Mills marshalling yard *en route*. Also, on another day, inspection of engineering works of reconstruction at Barking, London Tilbury & Southend Line, and new flyovers; this visit was arranged in conjunction with one to the rebuilt offices and depot at Barking of the Crow Carrying Co. Ltd., specialists in the transport of bulk liquids;

Southern Region: Kent Coast electrified lines, with visits to frame and relay room at Sittingbourne signalbox and the field station at Swale;

Western Region: Signal Works and Signalling School at Reading, also the new diesel depot, where various types of diesel motive power were displayed;

L.T.E. Underground: Northern Line signalling installation at Leicester Square.

Historic Rolling Stock

Arrangements were made for visits to the B.T.C. collection of historical relics in the newly established depot at Clapham, and to the B.T.C. repository of minute books, maps, timetables, and other archives at 66, Porchester Road, W.1.

Films were shown on April 26 of transport scenes in early part of the century, and documentary films, in the Film Theatre of

the British Council. They were introduced by Mr. Edgar Anstey, Chief Officer (Films), B.T.C.

Other visits included the following:—
London Airport and B.E.A. engineering base; L.T.E. bus works at Aldenham; the Port of London; Redifon Limited flight simulator factory at Crawley; S.P.D. Limited distribution depot at Salfords; Associated-Rediffusion Limited television studios at Wembley; British Road Services depots at Brentford (haulage), Acton (parcels) and City Road Offices (teleprinter terminal); British Waterways new lock at Brentford, Brentford depot (transshipment and storage), Bulls Bridge repair yard, and Docks & Waterways Research Station; George Ewer & Co. Ltd. (Grey-Green Coaches) chart room, operational control room and general head depot at Stamford Hill; B.P. Refinery (Kent) Limited refinery at Isle of Grain; Ford Motor Co. Ltd. works at Dagenham; and Unilever Limited Stork Margarine Works at Purfleet, featuring mechanical handling.

Visit of General Manager of National Railways of Colombia

Señor Angel Ignacio Ortiz, General Manager, National Railways of Colombia, visited Britain on April 21–28 under the auspices of the United Kingdom Railway Advisory Service.

On April 21 he visited the works of Siemens & General Electric Railway Signal Co. Ltd. and J. Stone & Co. (Deptford) Ltd., and the offices of the Westinghouse Brake & Signal Co. Ltd. In the evening he attended a Government reception at Lancaster House after which he was entertained to dinner by Mr. H. Andrew, Director of D. Wickham & Co. Ltd. Next day he inspected the new diesel railcar maintenance sheds at Cambridge before returning to London for lunch with the members of the British Transport Commission at 222 Marylebone Road.

After travelling to Glasgow overnight, Señor Ortiz was met by Mr. G. T. Owen, Director of the North British Locomotive Co. Ltd., on April 25 and taken for a tour of the company's works. He spent the afternoon with the Scottish Region of British Railways seeing various aspects of railway development in the Glasgow area.

Mr. G. Hulme, Chief Engineer, English Electric Co. Ltd., Vulcan Works, conducted Señor Ortiz on a tour of the works at Newton-le-Willows on the morning of April 26. He was entertained to lunch by Mr. F. Whyman, Divisional Director and General Manager of the Traction Division, A.E.I. Limited, and later toured the Trafford Park works of the company. In the evening he dined with the A.E.I. Overseas Association at the Midland Hotel, Manchester.

On April 27, Señor Ortiz travelled to Sheffield where he was met by Mr. C. F. Ryan, Chief of Development Railway Material, Steel, Peech & Tozer Limited. After being entertained to luncheon he was taken on a tour of the company's works. April 28 was spent with the General Electric Co. Ltd. viewing the Wotton Works, Birmingham. In the evening he was entertained to dinner at the Charing Cross Hotel by the Chairman, Brigadier A. E. M. Walter, and other members of U.K.R.A.S.

Those present were:
Señor Don Carlos Garces Sardi, Señor Dr. Vicente Pizano Restrepo, and Señor Dr. Manuel Laverde Aponte, Members of the Colombian Trade Mission; Señor Luis de Llano, Mexican press;

Brigadier A. E. M. Walter, Ministry of Transport; Messrs. E. B. C. Howard, Foreign Office; C. J. A. Whitehouse, T. F. J. Lattimer,

and M. P. Lam, Board of Trade; S. J. Bennett, Ministry of Transport; M. H. Lovell, Central Office of Information; R. C. Bond, E. S. Cox, and E. Anstey, British Transport Commission;

Messrs. T. J. Aldridge, L. G. Culleton, J. C. Kubale, and L. W. H. Lowther, Railway Signals Group of Manufacturers; H. Andrew, G. R. Curry, G. T. Owen, and G. N. Petty, Locomotive & Allied Manufacturers' Association; M. Gardiner-Hill and C. L. Trask, Railway Carriage & Wagon Building Association;

Messrs. M. C. Inglis, T. W. Richards, and L. S. Walsh, British Iron & Steel Federation; G. J. Corson, F. A. Manley, J. S. E. Rundle, and J. O. Sims, B.E.A.M.A.;

Messrs. C. F. Hawkins, Peat, Marwick, Mitchell & Co. Ltd.; and W. F. Gorst, *The Railway Gazette*.

Brigadier Walter, welcoming Señor Ortiz, drew attention to British Railways modernisation programme and explained the scope of the Advisory Service. Señor Ortiz expressed his gratitude to the Government and the Board of Trade for arranging his visit and also to U.K.R.A.S. for showing him details of the modernisation programme.

After dinner three films were shown: "Follow the Wire," by B.I.C.C. Limited, the Spanish version of "British Locomotives," made by the C.O.I. in conjunction with the L.A.M.A., and "A Report on Modernisation," by the B.T.C. Film Unit. Copies of these were presented to Señor Ortiz as mementos of his visit.

UDDEHOLM LIMITED LONDON OFFICE.—London office of Uddeholm Limited has been moved to 78, Buckingham Gate, London, S.W.1. Telephone number Sullivan 2741.

LOCOMOTIVE FIREMAN ELECTROCUTED BY A.C. OVERHEAD EQUIPMENT.—The fireman of a steam locomotive hauling a coal train was killed recently at Sandbach, on the Crewe to Manchester line of British Railways, London Midland Region, when he came into contact with a 25-kV. cable, part of the overhead equipment for this section of electrified line. He had apparently climbed on to the tender to rake down coal.

BIRMINGHAM RAILWAY CARRIAGE & WAGON CO. LTD.—Sir Bernard D. F. Docker, Chairman & Managing Director, Birmingham Railway Carriage & Wagon Co. Ltd., at the recent annual general meeting of the company, stated that the company had filled its order book for locomotives until early 1962 and is fully committed for carriages for roughly 12 months. Unfortunately, the wagon position still shows no indication of any improvement. The Directors recommended the payment of a dividend of 7½ per cent on the ordinary capital and a capital distribution of 5 per cent tax free from the sale of shares.

EDWARD G. HERBERT LIMITED BALANCING MACHINE AGENCY.—The sole agency in Great Britain and Eire for the complete range of Elettrorava balancing machines and equipment, made by Ing. A. Rava, Italy, has been granted to Edward G. Herbert Limited, Atlas Works, Levenshulme, Manchester, 19. This new agency is complementary to the long-standing arrangement with the Tinius Olsen Testing Machine company which has itself become the sole agent for Rava balancing equipment in the United States. Edward G. Herbert Limited is now in a position, to supply a very comprehensive range of balancing machines covering components from approximately 1 oz. to 10 tons in weight.

Parliamentary Notes

Government Transport Policy

Lord Pethick-Lawrence, a former Financial Secretary to the Treasury, initiated a general debate in the House of Lords on April 26 on the economic situation in which he supported the decision of the Chancellor of the Exchequer to put the figure for the deficit on the railways (£90 million) "above the line."

When the railways were in the private possession of companies, he added, many of them did not spend enough money on modernisation, so that at the time of nationalisation there were immense arrears of work to be done. To a large extent that had been the cause of the railways being in the red for a large part of recent years.

For "ideological reasons," Lord Pethick-

Lawrence stated, the Conservative Government had decided to reverse the plan promoted by the Labour Government, of treating transport as a whole. They chose to divide transport into road and rail. That dichotomy resulted in the fact that private enterprise got the plums and the railways were compelled to carry out all those necessary parts of transport which the private owners had not wanted to take over.

Private v. State-owned Industry

Mr. R. Gresham Cooke (Twickenham—C.), in a House of Commons debate on capital investment in private industry on April 26, said that the profit and loss account of I.C.I., which had a turnover last year of about £500 million and made a profit of £80 million was an example of private enterprise. On the other side there was the sad

picture of the B.T.C. which was about the same size as I.C.I., having a turnover of £500 million.

Mr. C. Bence (Dunbartonshire East—Lab.) pointed out that the B.T.C. did not have the same monopoly.

Mr. Gresham Cooke: The Commission lost £80-90 million, and the nation has to finance its capital expenditure by allocating £80 million a year below the line in the Budget. That is why private industry looks on nationalised industries rather askance and with a jealous eye, for every year some £620 million is provided out of national savings and the Budget for development of the nationalised industries.

Questions in Parliament

Provision for B.T.C. Deficit

Mr. Kenneth Lewis (Rutland & Stamford—C.) asked the Minister of Transport on April 28 when he expected to seek supplementary provision in respect of the B.T.C. estimated deficit in 1960-61; and what action he was taking in the meantime.

Mr. Ernest Marples in a written answer: Before the summer recess a Supplementary Estimate will be presented. With the agreement of the Chancellor of the Exchequer, use is being made, when necessary, of the Civil Contingencies Fund.

North Eastern Publicity

The North Eastern Region produced four new and colourful posters for display in stations throughout British Railways. Three of these posters are reproduced on this page.

The Bolton Abbey and Whitby posters are based on colour photographs by Anthony F. Kersting, A.I.B.P., F.R.P.S. The North East England poster was designed by Pat Nevin.

A Whitley Bay poster (not shown) was produced from a drawing by Laurence Fish in conjunction with the resort authorities. In bright and gay colours, it depicts a happy family scene.

All four posters have been printed by the lithographic process. "North East England" and "Whitley Bay" have been printed by Chorley & Pickersgill Limited of Leeds; "Bolton Abbey" by Chromo-works Limited, London, N.W.10; and "Whitby" by Jordison & Co. Ltd., Middlesbrough.

Three of the four new posters issued by the North Eastern Region



NO MERGER BETWEEN CHARLES ROBERTS & CO. LTD. AND BIRMINGHAM RAILWAY CARRIAGE & WAGON CO. LTD.—As a result of further consideration of the possibilities of effecting a merger between Charles Roberts & Co. Ltd. and the Birmingham Railway Carriage & Wagon Co. Ltd., the board of the former company has decided to abandon negotiations.

EASTERN REGION TRAIN-SPOTTERS WARNED OF ELECTRIFICATION DANGERS.—Train-spotters on British Railways Eastern Region lines are to be warned of the dangers of trespass, particularly in areas of electrification. Last week power was switched on on one section of the Liverpool Street suburban lines to Chingford, Enfield, Hertford East and Bishops Stortford preliminary to trial running on May 23. Local education authorities are being approached so that schoolchildren may be warned.

NEW PEWS AT LONGMOOR GARRISON CHURCH.—On May 1 three more pews were dedicated in the Garrison Church of St. Martin at the Railway Training Centre, Longmoor. They were presented by:—Mrs. A. Hill in memory of her husband Mr. W. Hill, formerly employed in a civilian capacity at H.Q., R.T.C., Longmoor; "Southern" friends of Longmoor (156 Stores Company) R.E.; Brother Officers, 152 Railway Construction Company, R.E. (SR), in memory of W. J. Scott and R. G. M. Matthews. The service was conducted by Captain A. Thomas, the dedication ceremony was performed by the Reverend K. C. Oliver, Assistant Chaplain General, Southern Command. The church was filled to capacity, and after the service, units of the Army Emergency Reserve in camp, Southern Region Old Comrades (156 Company), and Great Western Old Comrades (151, 152 and 154 Companies) paraded and the salute at the march past was taken by Brigadier A. G. P. Leahy, Commandant, who inspected and talked to the Old Comrades. Some of the Great Western Old Comrades spent Saturday night at Longmoor and were joined by others on Sunday.

Contracts and Tenders

Bridge construction at Lamseley Marrelling Yard

The Mitchell Construction Co. Ltd., Peterborough, has been awarded a further contract by the British Transport Commission for work in connection with the construction of the new marrelling yard at Lamseley, near Gateshead-on-Tyne. An earlier contract was awarded to Mitchell in February. The new contract involves the construction of four under-line bridges carried on reinforced concrete piles. The value of the two contracts is £110,000.

British Railways, London Midland Region, has placed the following contracts:—

The Turriff Construction Corporation Limited: reconstruction and widening of bridge No. 321 at Coventry Warwick Road and station platforms and drainage in connection with reconstruction of Coventry Station

Leonard Fairclough Limited: reconstruction of bridge No. 18 on Runcorn Branch

Sir Lindsay Parkinson & Co. Ltd.: tunnel work in connection with main-line electrification on Manchester-Crewe line

Leonard Fairclough Limited: construction of new bridge No. 19 on the Crewe-Birdwood line to accommodate the raising and electrification of existing double rail tracks in connection with the widening of Winsford-Middlewich road No. A.54 for the Cheshire County Council

Wilson Lovatt & Sons Ltd.: new freight terminal at Leicester Queen Street

Turriff Construction Corporation Limited: extension and reconstruction of platforms, earthworks, permanent way track section cabins and relay rooms on the Trent Valley Line between Stafford and Rugby

F. Parkinson Limited: extensions to Offices at Liverpool Brunswick Dock Goods Depot for S.P.D. Limited

British Railways, North Eastern Region, has placed the following contracts:—

Petbow Limited: supply of a diesel alternator standby set for Morpeth Station in connection with the installation of colour-light signalling between Newcastle and Berwick

Wingrove & Rodgers Limited: supply of a wool piling machine for use at Bradford Valley Goods Depot

Wright Anderson Limited: strengthening of an existing crane gantry at Walker-gate Carriage & Wagon Works

Landis Lund Limited: supply of a cylindrical grinder for York Carriage & Wagon Works

S. H. Heywood & Co. Ltd.: supply and installation of electric cabling and fittings at Gateshead Greensfield motive power depot

Dowsett Engineering Construction Limited: construction of two bridges in connection with the building of a new marrelling yard at Lamseley

W. E. Hargrave Limited: installation of heating and water services in offices at Holgate Villa, York

G. W. S. Burdett & Co. Ltd.: provision of a surface grinder for the York Carriage Works

Wakefield-Dick Industrial Oils Limited: provision of fuelling facilities for diesel railcars at Manningham motive power depot

Geo. Cohen Sons & Co. Ltd.: provision of a three-ton capacity mobile self-propelled crane

Thermit Welding (Great Britain)

Limited: supply of four sets of welding equipment

Enfield - Standard Power Cables Limited: supply of electric cabling and switchgear at Tweedmouth Station for colour-light signalling installation

Smithson & Sons Ltd.: provision of toilet block at British Railways Staff Association Club, Huddersfield

Robert Jenkins & Co. Ltd.: supply of nine 10,000 gal. tanks for oil storage at York motive power depot.

British Railways, Western Region, has placed the following contracts:—

John Morgan (Builders) Limited: construction of a signalbox at East Usk and of relay houses in the Newport Area

Wilson & Lovatt & Sons Ltd.: erection of office and amenity buildings and other works to be carried out at the running & maintenance depot, Stour-bridge

A. E. Farr Limited: provision of earthworks and fencing in connection with the construction of a District Engineers' Depot at Bristol Ashton Gate

George E. Taylor & Co. (London) Ltd.: supply, installation, testing, connecting, and setting to work of electric lighting facilities at Stormstown Yard, Abercynon

Reliance Telephone Co. Ltd.: provision and installation of an automatic telephone exchange at Marland House, Cardiff

Fairfield Shipbuilding & Engineering Co. Ltd.: supply of steelwork for the renewal of the cylinder bracings and diagonals to the bridge under the line, near Newport Station

Mountstuart Dry Docks Limited: annual overhaul and survey of the s.s. *Great Western*, 1960

Acrow (Engineering) Limited: supply and erection of a batching plant at Taunton Concrete Works

Bell & Webster Limited: supply and erection of a concrete framed storage building at Park Royal

Pelapone Limited: supply, delivery, and erection of a standby supply generating set in Newport High Street, Signalbox

Carter-Horseley (Engineers) Limited: renewal of the roof covering and glazing to the roof over the Inwards Side, Goods Depot, Cardiff Newtown.

The Export Services Branch, Board of Trade, has received calls for tenders as follow:—

From South Africa:

1 diesel shunting locomotive.

The issuing authority is the City Council of Pretoria Electricity Department. Tender documents may be obtained from the Controller of Stores and Buyer, P.O. Box 48, or 175 Lorentz Street, Pretoria, on payment of £5 5s. The tender No. is N2420. The closing date is May 19, 1960. Tenders should be addressed to the Town Clerk, P.O. Box 440, or City Hall, Paul Kruger Street, Pretoria, South Africa. No further information is available at the Board of Trade. The Board of Trade reference is ESB/11202/60.

From Pakistan:

200,000 broad-gauge wooden sleepers 9 ft. by 10 in. by 5 in.

10,000 special size hard-wood sleepers equalling approximately 52,623 cu. ft.

10,000 special size hard-wood sleepers

equalling approximately 49,509 cu. ft.

The issuing authority is the Pakistan Government Railways. Bids should be sent to the Director, Civil Engineering, Railway Board, Room 311, Second Floor, Tughlaq House, Sharah Kamal Ataturk, Karachi. The tender No. is 60/1720/3/S/SP. The closing date is June 15, 1960. The Board of Trade reference is ESB/11457/60.

98,000 broad-gauge transverse steel sleepers for 90 lb. F.F. rails.

The issuing authority is the Pakistan Government Railways. Bids should be sent to the Director, Civil Engineering, Railway Board, Ministry of Railways & Communications, Government of Pakistan, Room 311, Second Floor, Pakistan Secretariat Building, Karachi. The tender No. is 60-S/1720/6/RP. The closing date is June 9, 1960. The Board of Trade reference is ESB/11458/60. Photo-copies of tender documents are not available at the Board of Trade.

8,150 carriage and wagon springs.

The issuing authority and address to which bids should be sent is the Office of the Chief Controller of Stores, N.W. Railway, Empress Road, Lahore. The tender No. is 210-S/28/Pt. IV(PIC)-59. The closing date is May 28, 1960. Tender documents may be obtained from the above address at a cost of Rs.5 each, plus Rs.23 towards the cost of two specifications and 16 drawings, which is not refundable. No further information is available at the Board of Trade. The Board of Trade reference is ESB/11604/60.

From Sudan:

2 cylinder and steam chest boring machines.

The issuing authority is the Sudan Railways, Stores Department. Bids accompanied by a 2 per cent deposit should be addressed to the Office of Controller of Stores, Atbara, Sudan, or the Sudan Government Purchasing Agent, 3-5, Cleveland Row, St. James's, London, S.W.1. The tender No. is 1976. The closing date is May 12, 1960. No further information is available at the Board of Trade. The Board of Trade reference is ESB/11211/60.

From Egypt:

28 complete vacuum brake cylinders.

The issuing authority and address to which bids should be sent is the Egyptian Republic Railways, Purchase & Stores Department, Railways Buildings, fifth floor, Shoubra, Cairo. The tender No. is E.R.321 G.8/2/1283. The closing date is May 14, 1960. No further information is available at the Board of Trade. The Board of Trade reference is ESB/11240/60.

Further details relating to the above tenders together with photo-copies of tender documents, unless otherwise stated, can be obtained from the Branch (Laccon House, Theobald's Road, W.C.1).

SMALL & PARKES LIMITED NEW DEPOT.—Small & Parkes Limited has opened a new depot at 61, Cardigan Street, Luton. Telephone 4279. Mr. E. J. Moore is the company's representative in the area. The Depot Manager is Mr. Colin Sanderson. The new depot offers full facilities for relining all types of automotive and industrial brake linings and clutch facings.

Notes and News

British Transport Staff College.—The architect responsible for the adaptation and decoration of the British Transport Staff College at Woking, which was described last week, was Dr. F. F. C. Curtis, A.R.I.B.A., Architect to the British Transport Commission.

Guest Keen Iron & Steel Co. Ltd. Expansion Plan.—Guest Keen Iron & Steel Co. Ltd. has announced a major expansion plan under which it is to spend about £6,750,000 in raising production of iron and steel by one-third at its East Moors Works in South Wales. By 1963, when the new plant will have been brought into operation, capacity will be 1,000,000 tons of ingot steel a year. Much of the extra steel produced will be required for further processing within the group, to provide drop forgings, bolts and

nuts and reinforcement materials. The new project will bring total capital expenditure since the war at East Moors to around £20,000,000.

London Midland Region Amateur Musical Society Play.—The West-end play *Brigadoon* will be performed at the Scala Theatre, London, by British Railways, London Midland Region (London) Amateur Musical Society on May 13 and 14.

Marcroft Wagons Limited Results.—Marcroft Wagons Limited has declared a dividend of 17½ per cent for 1959 (12½ per cent and bonus 2½ per cent). The consolidated profit was £70,544 (£64,252), less tax £36,226 (£36,214), leaving £34,318 (£28,038). The ordinary dividend was £21,437 (£18,375).

Clyde Ferry Services Rates Cut for Small Motorcars.—Alexander Stewart, General Manager of the Caledonian Steam Packet Co. Ltd., has announced reduced rates for motorcars not more than 11 ft. long. From June 1 the rates from Gourock to Dunoon, for example, will be 14s. single and 21s. return; and from Fairlie and Ardrossan to Arran 40s. single and 60s. return. These charges represent savings of up to 10s. on the present rates for cars up to 13 ft. long.

Early Summer Holiday Trains from the Sheffield District.—To cater for passengers from the Sheffield district whose holiday plans involve travelling before the introduction of the Summer services on June 13, the Eastern Region of British Railways has again arranged to run a number of special through trains to the various resorts early in June. These holiday trains are in addition to the normal timetable trains, and they will run on June 3, 4, 10 and 11.

English Steel Corporation Limited Tinsley Park Developments.—English Steel Corporation Limited announces that the consent of the Iron & Steel Board has been obtained to further developments at Tinsley Park, Sheffield. It is proposed to replace billet mills at River Don and Stevenson Road Works with an installation comprising one 42-in. blooming mill and two 32-in. billet mills. The bar rolling mills at River Don Works are being replaced by new mills. To provide the additional steel required, three 100-ton electric melting furnaces are being installed. The estimated cost of the project is £26,000,000 and it is planned to be in full operation in 1963.

Western Region First-Aid Movement.—The teams which gained the first ten places in the British Railways, Western Region, first-aid semi-finals competed in the final competition held in the Porchester Hall, Paddington, on April 26. The tests were set by Dr. J. C. Graham and Dr. F. H. Taylor of London and Dr. P. J. Roylance of Bristol. The presentation of prizes and trophies was presided over by Mr. S. G. Ward, Regional Establishment & Staff Officer and the presentations were made to the winning team by Mr. J. R. Hammond, General Manager. The result of the test was announced by the Regional Ambulance Secretary, Mr. J. A. Martin. Out of a maximum of 500 marks, Bristol D.T.S.O., winners of the Challenge Shield gained 333 and Newport R. & M., winners of the Carvell Cup gained 330. The Henry Butt Bowl was presented to the Paddington Goods team, who secured 253 marks in class 2 Section. A vote of thanks to the adjudicators, patients and other helpers was proposed by Mr. J. W. J. Webb, Regional Accountant and to Mr. Hammond and Mr. Ward by Mr. L. A. Webber, captain of the Bristol team. The Bristol D.T.S.O. and Newport R. & M. teams will represent the Region in the British Railways, Docks

and London Transport (Railways) National Competition, in the Central Hall, Westminster, on June 9.

Runabout Tickets in Eastern Region.—Runabout tickets are being issued by British Railways, Eastern Region, this year, which allow unlimited travel in 11 different areas. The tickets cost from 25s. to 42s. 6d. according to the area covered. They are being issued until October 29 and are valid for any one week.

British Iron & Steel Federation Stand at Fuel Efficiency Exhibition.—The British Iron & Steel Federation display at the Fuel Efficiency Exhibition at Olympia, April 27–May 6, showed major aspects of a fuel efficiency and clean air programme carried out by the steel industry as part of its £1,000 million development programme which will be completed by 1962. It is claimed that the programme has resulted in greatly improved amenities and a marked conservation of fuel.

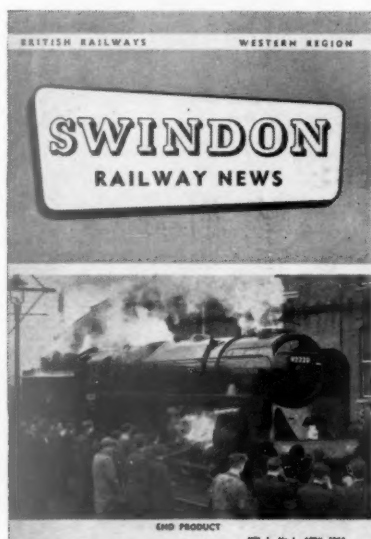
The Northern General Transport Co. Ltd. Meeting.—Mr. W. T. James, Chairman, the Northern General Transport Co. Ltd., stated at the recent annual general meeting of the company that 38 single-deck omnibuses and 12 coaches were placed in service during 1959 at a cost of £217,000. He referred to the close liaison which exists between the company and British Railways, a policy which has been maintained for more than 30 years, and stated that a Standing Joint Committee meets regularly and considers proposals for the co-ordination of rail and road services.

Beyer, Peacock & Co. Ltd. Results.—Mr. Harold Wilmot, Chairman, Beyer, Peacock & Co. Ltd., stated at the annual general meeting of the company on May 2 that the figures for 1959 were somewhat better than forecast a year ago. To undertake a change-over from steam to other forms of main-line rail traction, he said, and to avoid during such a period a major loss on working may reasonably be regarded as exceptional in the locomotive industry. The profit taken up by the company after payment of taxation amounted to £142,048 (£128,816) and a final dividend of 12 per cent was recommended.

Public Transport Arrangements for the Royal Wedding.—London Transport Executive has made the following arrangements in connection with the wedding of Princess Margaret to Mr. Antony Armstrong-Jones at Westminster Abbey today. On the Underground normal rush-hour services will be operated and at other times frequent services of full-length trains will be run on all lines. All stations in the central area will remain open unless the police request a temporary closure. First and last trains will be as usual. Every effort will be made to maintain full services of buses and coaches, but 46 routes will have to be diverted from and within the central area at various times and in different directions.

New Premises for International Computers & Tabulators Limited.—A double opening ceremony was performed simultaneously by Lord Mills, Paymaster General, last week from the new demonstration centre of International Computers & Tabulators Limited in Hamilton House, Piccadilly, London. By the use of two-way closed-circuit television he was able to open the building in Piccadilly and, assisted by Mr. W. J. Bolton, Mayor of Fulham, the new six-storey I.T.C. Computer Centre at Putney Bridge House four miles away. Hamilton House is entirely devoted to punched-card machines, whereas the larger building at

W.R. Staff Magazines



Management-staff communications (see comment on page 527)

Putney houses staff concerned with the installation and operation of computer systems for railway and many industrial applications.

British Wagon Co. Ltd. New Office.—A new office at Pearl Assurance Chambers, 77-79, High Street, Watford, telephone, Watford 24169, has been opened by the British Wagon Co. Ltd. The manager is Mr. A. R. Stoneham.

Central Uruguay Railway Co. of Monte Video Ltd. Meeting.—A general meeting of the Uruguay Railway Co. of Monte Video Ltd. will be held at 121 Queen Victoria Street, London, E.C.4, on May 23 for the purpose of presenting the liquidators' acts and dealings and showing the conduct of the winding-up during the year ended February 23, 1960. The liquidators' remuneration for the past year will also be decided.

Channel Tunnel "Now or Never."—Sir Ivone Kirkpatrick, British Chairman of the Channel Tunnel Group, stated recently that if the plan for the tunnel were not proceeded with, "it will be killed for a generation, if not for ever." It was unlikely, he added, that in their lifetime a group of men again could be found who would be prepared to spend the large sum necessary to launch the plan for the tunnel.

Carriage of New Motorcars by Rail to Scotland.—Fifty new Renault motorcars straight from France arrived in Glasgow on April 29 by a special train which left Southampton Docks at 6.15 p.m. the previous night. Direct rail transit from the port eliminates the clocking up of 500 miles and ensures that the cars reach the Scottish distributor in the freshest possible condition. The cars were driven off the train at a special end-loading ramp at Stobcross Goods Station, Glasgow. They were consigned to Wylie & Lochhead Limited, Glasgow, which will distribute them in Glasgow and the West of Scotland.

Construction of Dive-under at Colchester, Eastern Region.—Work began on May 20 on the construction of a 1,200-yd. dive-under line, at Colchester, British Railways, Eastern Region. Costing nearly £150,000, it is one of the main features in a big programme of track work now being carried out in connection with the complete reconstruction of Colchester Station. When work is completed, main-line trains in the area will be able to reach speeds of up to 90 m.p.h. The new single-track dive-under line will enable Clacton-bound trains to pass under the main lines at one point thus avoiding conflicting train movements over the main lines to London.

Partial Closure of Liverpool Street Station.—Ten of the 18 platforms at Liverpool Street Station, British Railways, Eastern Region, will be closed to traffic this weekend, while overhead wiring in connection with the suburban electrification programme is installed. The lines affected are those to Chingford, Hertford East, Bishops Cleeve, and Enfield Town. From 10.30 p.m. on May 7 until 3 a.m. on May 9, the whole of the west side of the station, as well as the suburban lines between Liverpool Street and Bethnal Green, will be closed to traffic. Main-line trains, with a few exceptions, will all arrive and depart from east-side platforms, while a number of electric trains will either be terminated, or started from, Stratford. While electrification work goes on in the Liverpool Street area, new signalling will be brought into use on the Enfield Town line. This will mean completely withdrawing the service for 36 hr. Bridge reconstruction work on the Chingford line will mean diver-

ting the service to Liverpool Street via Stratford from approximately 3 p.m. on Saturday until early Sunday morning.

International Nickel Co. of Canada Ltd. Two-for-One Stock.—The International Nickel Co. of Canada Ltd. has been granted supplementary letters patent confirming the two-for-one stock split and increase of authorised capital recently sanctioned by shareholders. Shareholders on record at the close of business on April 28 receive certificates for an additional number of shares equal to the number of shares held before the split.

Larger Order Books for Machine Tools.—A continued improvement in the position of the machine tool industry is shown by the figures for the month of February. Total deliveries, worth £7,781,000 in February, 1960, were 9 per cent higher than in the previous month, and 36 per cent higher than a year earlier, with export deliveries (which totalled £2,162,000) particularly sharply up—they were 27 per cent higher than in January and 55 per cent higher than in February, 1960.

Improved Sunday Rail Services for Visits to Yorkshire Dales.—With the introduction of the through diesel services from Sheffield Midland, via Barnsley, to Leeds, the Eastern Region of British Railways has taken the opportunity to run diesel trains from the Sheffield area through to Burley-in-Wharfedale, Ben Rhydding, Ilkley, and Bolton Abbey, on Sundays. This new facility introduced on May 1 and to operate until September 11, will offer ramblers in the Sheffield, Wombwell and Barnsley areas the opportunity to visit some of the beauty spots in the Yorkshire Dales.

Fourth Production Exhibition.—In opening the Production Exhibition at Olympia, London, earlier this week, Mr. J. C. George, Parliamentary Secretary to the Ministry of Power, spoke of the good opportunities which it and the associated conference organised by the British Productivity Council offered in the way of learning about new devices and ideas. He stressed the importance of keeping an open mind towards the possibilities of changes in method and in the use of materials. On the subject of electronics he pointed out the importance of engineers knowing enough of the capabilities and limitations of computers to be able to frame their questions precisely.

British Standard for Rubber Gloves for Electrical Purposes.—The revised British Standard B.S. 697: 1960 specifies requirements for rubber gloves for use at four different voltage potentials: up to 650, 1,100, 3,300, and 4,000 V. The gloves may be made by a dipping process or built-up from sheet rubber, or by a moulding process. A feature of the revision is that each glove is now required to be tested twice by the manufacturer for its voltage withstand. The second test has been introduced to seek out those gloves which have a tendency to pick up excess moisture, which reduces dielectric strength. Research work into this phenomenon has been carried out by the Electrical Research Association, who have taken an active part in the re-drafting of the standard. Copies of the standard may be obtained from the British Standards Institution, Sales Branch, 2 Park Street, London, W.1, price 5s.

British Wagon Co. Ltd. Results.—The accounts of the British Wagon Co. Ltd. showed that the profit of the group, after taxation, for 1959 was £369,243 (£261,118) and at December 31, 1959, the deferred income amounted to £2,358,996 (£1,534,432). The Chairman, Mr. R. A. Dyson, stated that this has been a year of steady growth and the

satisfactory increase in business undertaken and profits earned is clearly shown. Once again there had been a substantial increase in deferred income, an important feature in considering future prospects.

Glenfield & Kennedy Limited Results.—A final dividend 15 per cent, making 20 per cent for 1959 (same) has been declared by Glenfield & Kennedy Limited, group profit was £558,885 (£438,999). Tax, after crediting adjustments was £232,112 (£209,161), and the net profit £326,773 (£229,838).

Birmingham & Midland Motor Omnibus Co. Ltd. Results.—The net profit for 1959 of the Birmingham & Midland Motor Omnibus Co. Ltd., which is jointly controlled by Birmingham & District Investment Trust and the British Transport Commission, amounted to £414,256 (£409,591). A final dividend of 6 per cent making 10 per cent for the year (same) has been recommended.

British Standard for Gauges.—A new British Standard publication, B.S.1780: 1960, Bourdon tube pressure and vacuum gauges, specifies requirements for indicating pressure gauges, vacuum gauges, and combined pressure and vacuum gauges of the bourdon-tube type. The range of nominal sizes is 2-12 in. and the maximum scale readings are up to 16,000 lb. per sq. in. or up to 6 tons per sq. in. There are sections dealing with materials and construction, dimensions, accuracy, testing and inspection, and marking and packaging. The 60 pages include 18 illustrations. Copies price 15s., may be obtained from the British Standards Institution, 2, Park Street, London, W.1.

Waterloo Building Plan Refused.—The Minister of Housing & Local Government and the Minister of Transport have refused an application by the British Transport Commission to build an 11- and 12-storey shop and office block adjoining Waterloo Station, London. Refusal was on the ground that the proposed building, costing £3,500,000, was too big. The letter notifying the decision said that the Ministers would see no objection to a building containing shops and offices on this site which conformed to the prescribed plot ratio. They pointed out that this would allow flexibility in design if the Commission wished to retain on part of the site a building of the height now proposed.

Derwent Valley Light Railway Meeting.—Mr. C. W. G. H. Thompson, Chairman of the Derwent Valley Light Railway Company, reports an increase of 5,314 tons in Minerals and Merchandise traffic for the year ended December 31, 1959. Sugar beet during the year was slightly up. He thought that many farmers now realised that the rail service enabled them to get their beet away more quickly than by road. Potatoes and vegetables were still disappointing traffics; there is little hope of getting these back to rail in any quantity. Coal and Coke carried was 2,438 tons less than the previous year. Timber traffic amounted to 3,051 tons. Gross receipts were £24,343 (£24,212) and expenditure £22,394 (£21,731). Miscellaneous receipts amounted to £5,028 (£4,933), resulting in a net revenue of £6,977 6s. 11d. After adding the balance brought forward and allowing for tax adjustments, £10,609 is available. The board recommended dividends of 5 per cent on the preference stock and 6 per cent on the ordinary shares.

Railway Correspondence & Travel Society Annual Dinner.—The Railway Correspondence & Travel Society held its annual dinner recently at "The Windsor Castle," London, S.W.1. Mr. R. D. Goddard, Chairman of the Society, presided. Ninety members and guests were present. After

the Loyal Toast, Mr. C. K. Dunkley, proposing that of "British Railways," mentioned the continued friendly relations between the railway authorities and the Society. Mr. T. C. B. Miller, Chief Mechanical & Electrical Engineer, Eastern Region, British Railways, replied. He went on to speak of the influence of the society in railway circles. Mr. J. N. Maskelyne, Past President of the Stephenson Locomotive Society, gave the toast of the Railway Correspondence & Travel Society, remarking that his recently-ended presidency of the S.L.S. more than spanned the life of the R.C.T.S. What had started out as hostility towards the intruder of 1928 had long ago turned into a most cordial relationship. Mr. C. Smith, President of the R.C.T.S., responded.

Nigerian Railway Corporation London Office.—The London office of the Nigerian Railway Corporation has moved to the Adelphi, John Adam Street, London, W.C.2. Telephone number Trafalgar 5644.

Clayton Dewandre Co. Ltd. Expansion.—Mr. A. V. Perry, Chairman of Clayton Dewandre Co. Ltd., in his annual statement reports that the total output for the year ended December 31, 1959, was some 22 per cent up on 1958, and that the company's two Lincoln factories are at full capacity. The company has acquired on a long lease a factory at Southampton. This will give additional capacity for the increased demand for products for the commercial vehicle industry, and to manufacture a new power-assisted braking device for light vehicles. A new subsidiary, Power Brakes Limited, has been formed to deal with the capital investment in Southampton.

Switchgear & Cowans Limited Increased Profit.—The directors' report and accounts of Switchgear & Cowans Limited, for the year 1959 show an increase of approximately 27 per cent on those for 1958 as, after providing an increased figure, £58,020 for depreciation, the net profit amounts to £242,318. The increase in profit reflects improvement in both the parent company and the subsidiaries. After providing for taxation and debenture redemption the net profit is £118,278 and the directors propose that this shall be dealt with as follows: the payment of a final dividend of 12½ per cent (making 17½ per cent for the year equivalent to £48,234), transfer to general reserve, £60,000, carry-forward on Profit and Loss Account, £10,044.

Railway Fares Increased.—In a recent letter to *The Daily Telegraph* a Mr. E. H. Butler accused the British Transport Commission, and, it is presumed, the Transport Tribunal of "behind-the-scenes" methods because the latter recently approved in private an application to increase certain railway fares. Mr. J. H. Brebner, Public Relations Adviser B.T.C., has printed in reply that Section 23, of the Transport Act of 1953 empowers the Tribunal in certain circumstances to increase temporarily all or any of the maximum charges authorised by a charges scheme. If an order is made, the Commission is required under Section 79 to apply within a month for a permanent alteration of the charges scheme, and objections can then be heard in public.

Pressed Steel Co. Ltd. Results.—For the year ended December 31, 1959, the fixed assets, at cost, of the Pressed Steel Co. Ltd. expanded by nearly £3,000,000 to £22,660,000, with the net figure, after depreciation, rising to £12,350,000 (£10,070,000). Outstanding commitments were about £4,000,000, but the figure is now substantially higher due to further commitments under the expansion

programme. Current assets totalled £20,940,000 (£20,040,000) including cash £1,480,000 (£4,530,000), and liabilities were £8,960,000 (£7,700,000). The company is to raise £10,700,000 by a rights issue of 5s. ordinary shares at 30s. each. Trading profits for 1959 were £6,810,000 (£5,940,000). The net profit was £2,460,000 (£2,020,000) and the dividend is raised by 5 per cent to 30 per cent.

B.R.S. Acquires Parcels Carrying Company.—British Road Services has acquired N. Francis & Co. Ltd., the London parcels carrying organisation. The sale was completed on April 29. The company will still trade under the name of N. Francis & Co. Ltd. The Chairman is Mr. A. J. Wright, Divisional Manager, South Eastern Division, British Road Services. The Directors are Mr. J. L. Willoughby, Traffic Manager (Parcels), B.R.S.; Mr. A. F. Walton, London Parcels Manager, B.R.S., and Mr. E. Moffat, Divisional Accountant, South Eastern Division, B.R.S., who is also Secretary of the company. The Manager is Mr. F. R. Parkin, formerly, Area Manager, London Provincial Services, British Road Services.

Forthcoming Meetings

May 6 (Fri).—The Railway Club, at the Royal Scottish Corporation, Fetter Lane, E.C.4, at 7 p.m. Paper on "Modern railway signalling developments," by Mr. P. Broadley.

May 13 (Fri).—Permanent Way Institution, East Anglia Section. Visit to Edgar Allen & Co. Ltd., Sheffield.

May 14 (Sat).—Permanent Way Institution, London Section. Visit to new carriage depot at Ilford, Essex.

May 16 (Mon).—Historical Model Railway Society, at Caxton Hall, Westminster, S.W.1, at 7 p.m. "The Dartmouth & Torbay Railway," historical description by Mr. I. H. Smart.

May 21 (Sat).—Railway Correspondence & Travel Society, South of England Branch, at the Junction Hotel, Eastleigh, at 6.30 p.m. Paper on "Some footplate experiences," by Mr. A. F. Cook.

May 26 (Thu.) to June 8 (Wed.).—British Railways, Southern Region, Lecture & Debating Society. Scandinavian Tour.

May 27 (Fri.) to June 2 (Thu.).—Permanent Way Institution, all sections. Summer Convention at Ostend, Belgium.

May 27 (Fri).—Institution of Locomotive Engineers, at the Institution of Mechanical Engineers, 1, Birdcage Walk, Westminster, S.W.1. Joint symposium with the Aluminium Development Association on the application of aluminium to railway rolling stock. Morning session, 10 a.m. to 12.30 p.m. Afternoon session, 2.30 to 5 p.m.

OFFICIAL NOTICES

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Railway Stock Market

The initial effect of the announcement of the credit squeeze was a moderate rally in stock markets. This was because of relief that uncertainty had ended as to the plans of the Chancellor of the Exchequer. There was also satisfaction that they were milder than had been widely expected in the City. The squeeze can be made more severe in the future if this is considered necessary to keep inflation in check, but there are hopes that later this year it may be possible to end the credit squeeze entirely. This week, buying in stock markets has been more in evidence, but it was selective and concentrated on shares which offer attractive yields and seem to have been reduced to unduly low levels in the set-back in markets last month.

Among foreign rails, Antofagasta ordinary stock strengthened to 14: the 5 per cent preference stock was 28. Mexican Central "A" bearer debentures were 58½ and United of Havana second income stock was again quoted at 6, with Sao Paulo Railway 3s. units 1s. 4½d.

Buyers were about for Chilean Northern 5 per cent first debentures, which changed hands up to 60. Guayaquil & Quito assented bonds were again quoted at 77 and Brazil Railway bonds were 7, with Paraguay Central prior debentures 15½ and the "A" debentures 5.

Costa Rica ordinary stock was 31½, the first debentures 90 and the second debentures 95.

International of Central America shares were quoted at £23½ and the preferred stock at \$112½.

Canadian Pacifics again moved closely with Wall Street, and at \$46½ failed to hold an earlier small gain. At their current price the yield is almost 6 per cent, and the prevailing belief is that there are reasonable prospects of the dividend being maintained. Canadian Pacific preference stock eased to 58½ and the 4 per cent debentures to 64. White Pass shares were \$13½.

West of India Portuguese capital stock was quoted at 111½d with the 5 per cent debentures 93½. Barsi Light Railway ordinary stock was 16.

The shares of locomotive builders and engineers have shown only moderate activity, but tended to strengthen with the better trend in stock markets generally. Beyer Peacock 5s. shares at 6s. 9d. remained under the influence of the lower profits. Charles Roberts 5s. shares strengthened to 13s. 9d., at which there is a yield of nearly 5½ per cent on the basis of last year's 15 per cent dividend. After news of the abandonment of the merger proposals with the last-named company, Birmingham Wagon shares have fallen sharply to 33s. 6d.

In other directions, there have been sharp fluctuations in the 4s. shares of the Channel Tunnel Company which a few months ago were changing hands at over 50s. At one time last week they were down to 25s. 3d. but have since rallied to 26s. 9d. Recent selling has been attributed to fears that the British Government may turn down the tunnel plan.

Wagon Repairs 5s. shares were 11s. 3d. and Gloucester Wagon 5s. shares 11s. 9d. G. D. Peters were quoted at 19s. 4½d. x d. Dowty Group 10s. shares rallied to 33s. 3d. and Pressed Steel 5s. shares improved to 34s. 1½d.

Machine tools were better with Alfred Herbert at 53s. 3d. Pollard Bearing 4s. shares were 34s. 6d. and Ransomes & Marles 5s. shares have strengthened to 24s. British Oxygen rose sharply to 87s. 6d., with the better trend of markets. Vickers were firmer at 31s. 3d. Associated Electrical rose to 55s. General Electric were 38s. 9d., English Electric 40s. 3d. and Crompton Parkinson 5s. shares 12s. 3d.

